

## CCDA-NAC Members View Product Problems

By JAMES W. MILLER  
Croplife Staff

BALTIMORE—The problems involved in introducing new agricultural chemical products on the market received the attention of 350 chemical marketing and production specialists at a joint meeting of the Commercial Chemical Development Assn. and the National Agricultural Chemicals Assn. here Nov. 20-21.

Panel discussions on growth regulators, herbicides, fungicides, insecticides, animal health products and feed supplements were held at the Lord Baltimore Hotel on Nov. 20. On the following day the meeting adjourned to the Plant Industry Station of the U.S. Department of Agriculture, Beltsville, Md., where government scientists reviewed research work now in progress on these groups of products.

The CCDA, founded in 1947, represents more than 200 chemical firms which are interested in commercial introduction of new chemicals and new uses for old chemicals. The association's activities include market analysis, product development, project economics and technical service.

Dr. R. H. Wellman, manager, Agricultural Chemicals Division, Union Carbide Chemicals Co.; Dr. Keith C. Barrons, manager, Agricultural Chemicals Development Section, Dow Chemical Co.; Dr. Ely M. Swisher, assistant head in charge of development, Agricultural and Sanitary Chemicals Dept., Rohm & Haas Co.; Dr. George R. Ferguson, president, Geigy Agricultural Chemicals Division, Geigy Chemicals Corp., and Dr. John H. Hare, head of Development Department, Agricultural Research & Development, Chas. Pfizer & Co., Inc., were panel members during the first day's session.

That industry should seek better methods for determining toxicity in order to reduce costs of investigating

residues and tolerances was urged by Dr. R. Blackwell Smith, Jr., president of the Medical College of Virginia, the luncheon speaker, on Nov. 20. Dr. Smith is chairman of the sub-committee on toxicology of the important Committee on Food Protection of the National Research Council. With the advent of the Miller Bill and the recent additives amendment the responsibility of safe use of chemicals is firmly in the hands of the chemical industry, Dr. Smith said.

The speaker explained that the (Turn to NEW CHEMICALS, page 18)

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## New Jersey Dealers Told to Give Customers Service, Information

NEW BRUNSWICK, N.J.—Pesticide dealers and salesmen had some earnest advice from a Food and Drug Administration official at the annual Rutgers University Pesticide Dealers' Conference on Nov. 20.

Robert C. Stanfill, chief of the Philadelphia District, FDA, directed his admonition to the "few pesticide salesmen or distributors more interested in peddling merchandise than in rendering a customer an honest service."

He said his office had heard about growers being advised in a few in-

### Fertilizer-Pesticide Mixes Studied

## USDA Issues Report On U.S. Consumption

BELTSVILLE, MD.—The results of a survey of the consumption in the U.S. of fertilizers containing pesticides for the year ended June 30, 1956, have recently been released by the fertilizer investigations research branch, soil and water conservation research division, Agricultural Research Service, U.S. Department of Agriculture.

The report, prepared by Walter Scholl, Hilda M. Wallace and Florence B. Crammatte of USDA, is based upon information supplied by all fertilizer manufacturers and state fertilizer control officials.

The report in its complete form follows:

### Trends

For some years prior to World War II a few hundred tons of various grades of mixed fertilizers containing lead arsenate were made annually to customers' specifications by manufacturers in the Middle Atlantic States (8). As a rule, about 100 lb. of arsenate were added per ton of fertilizer. According to Farrar (5), greater interest in the application of fertilizers containing pesticides stemmed from the discovery in 1944

Table 1. - Fertilizer-pesticide products consumed, in States, in selected years, in tons.

State	Consumption <sup>1/</sup>		
	1955	1956	1957
Indiana <sup>2/</sup>	1,165	1,326	1,972
Kansas <sup>3/</sup>	969	660	771
Louisiana <sup>4/</sup>	102	541	986
Maryland <sup>2/</sup>	453	534	1,260
Michigan <sup>2/</sup>	6	373	316
Missouri <sup>1/</sup>	--	3,398	4,621
Virginia <sup>2/</sup>	--	4,568	4,061

<sup>1/</sup> Source: State tonnage reports.  
<sup>2/</sup> Year ended June 30. <sup>3/</sup> January 1 to June 30. <sup>4/</sup> Year ended October 30. <sup>5/</sup> Calendar year.

### EDITOR'S NOTE

This report on the use of fertilizer and pesticide mixtures in the U.S. took an unusual length of time to compile because of the volume of material involved, and also because the data had to be gathered from many sources, some of which were delayed in reaching USDA. The Fertilizer Investigations and Research Branch of the Soil & Water Research Division made the compilation.

of the insecticidal value of DDT and the subsequent development of numerous other chlorinated hydrocarbons for control of soil pests. The consumption of fertilizers containing these organic chemicals was estimated roughly as 10,000 tons in 1950 (8). Regional estimates have been provided by Jacob (6, 7) for a two-year period. Consumption in 1952-53 ranged from 100 tons in the West South Central region to 60,000 tons in the South Atlantic region and totaled 87,100 tons for the U.S. For 1953-54, Jacob found no change in consumption in the West South Central region, but use in the South Atlantic region had increased to 73,-

(Turn to USDA REPORT, page 17)

## Arizona Anhydrous Facility Planned

CHANDLER, ARIZ.—Announcement of the immediate construction of a 60 ton per day anhydrous ammonia plant in Arizona was made recently by C. P. Gould of Litchfield Park, Ariz., president of Southwestern Agrochemical Corp., and Owen Cooper of Yazoo City, Miss., chairman of the board of First Mississippi Corp.

A new Arizona chemical company will be formed by the two participating corporations to own and operate the new facility. The plant will be located in Chandler with an estimated cost of \$4 million.

A contract for the plant has already been placed with Chemical Construction Co. of New York City, which is already designing the plant and will begin construction early in 1959.

Representing Southwestern Agrochemical Corp. in the negotiations were the members of the executive committee of the board of directors. They are: Gen. J. Clyde Wilson, Buckeye, chairman; Mr. Gould; Norris L. Enloe, Chandler, secretary-treasurer; W. L. Rice of Mesa, and Duncan Sim, general manager. Representing First Mississippi Corp. in addition to Mr. Cooper was J. F. Babbitt, vice president.

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## Opening of Seaway May Increase Control Problems

OTTAWA—Opening up of the St. Lawrence Seaway will add to the complexity of insect control problems as inland ports are made accessible to ocean-going ships, says Dr. H. A. U. Monro, head of the fumigation unit, Science Service Laboratory, London, Ont.

He says health authorities will have to widen their supervision to cover additional ports of loading and unloading on the upper reaches of the St. Lawrence River and on the shores of the Great Lakes.

Plant Protection Division, Canada Department of Agriculture, has supervised closely importation of plant products to prevent introduction and spread of insects. Officials also have guarded against the possibility of other products becoming infested while in contact.

Up to now importations were made chiefly through the all-year maritime seaports of Saint John and Halifax, or through Montreal during the St. Lawrence navigation season. With treatment of infested products and disinfection of the ships concentrated at several focal points, organization was fairly simple, says Dr. Monro.

With the opening of the seaway, detection and cleaning up of infestations take on added proportions. Even if infestation is discovered early, inspectors at other destination ports would have to be alerted. They, in turn, would have to arrange for required treatments.

Further, inspectors at Great Lakes ports will have to be constantly on the lookout for direct consignments with infestation that have escaped detection at ports nearer the seaboard. Besides new problems with imports, anticipated developments in the movement and storage of grain for export may bring about certain difficulties. More American grain will likely be handled through Canadian elevators.

Owing mainly to warmer conditions in the area of its origin, U.S. grain is perhaps more likely to be infested than Canadian grain. There will be the problem of treating the American grain, by fumigation or other methods, not only to reduce the infestation in the material itself, but also to insure the insect-free condition of the storages and to prevent cross-infestation into Canadian grain stores nearby.

## Insecticide, Fertilizer Group Meets in Mexico

VERA CRUZ, MEXICO—The annual meeting of the Mexican Insecticide and Fertilizer Manufacturers Assn. was held here Nov. 12-15.

Jack L. Schack, Diamond Black Leaf de Mexico, S.A. de C.V., was elected president and Raul Suarez, Productos DDT, S.A., vice president. Lauro Gallardo, Q.B.P., Distribuidora Shell de Mexico, S.A., was elected secretary and Salvador Dominguez, C.P.T., Agencias Newell, S.A., was elected treasurer.

Named to the board of directors were: Bernardo Bukantz, Watson Philips; Alfredo Becker, Jr., Dupont, S.A.; Philipp Kuehne, Quimicas Unidas, S.A.; Luis Y. Quijano, Agricultura Nacional, S.A.; Fernando L. Schmall, Anderson Clayton in Delicias, Chih.; Guillermo Perez, Proveedora Agricola Langunera, S.A. in Torreon, Coah.; Alberto Fernandez, Insecticidas Cruz Negra, S.A. in Monterrey; Luis Briones, Insecticidas y Fertilizantes Diamond del Norte, S.A. in Matamoros, Tamps; Francisco Schwarzbeck, Insecticidas Diamond de Pacifico, S.A. de C.V. in Cd. Obregon, Son.; and Carlos Aulenbacher, Insecticidas Ortho, S.A. in Mexicali.

## OOPS, WRONG NUMBER

In its report of the National Fertilizer Solutions Assn. annual meeting in Cincinnati (page 1, Nov. 24) Croplife incorrectly quoted Richard Cecil, Bartlett & O'Bryan Fertilizer Co., Owensboro, Ky., retiring president, as stating the group had gained eight new members last year. Actually, Mr. Cecil reported a growth of 68 new members. The error occurred in transmitting the convention story by overnight wire from Cincinnati to Croplife's Minneapolis home office.

## Consolidation Program Announced by IMC

CHICAGO—International Minerals & Chemical Corp. announced a consolidation program to improve its organization. The move, announced by T. M. Ware, president, brings the phosphate chemicals and phosphate minerals divisions into a single phosphate unit and consolidates research and engineering into one staff division handling research, engineering and development.

George W. Moyers, with IMC since 1927 and a vice president since 1952, heads up the new phosphate division. Dr. I. Milton LeBaron, research vice president and an IMC employee since 1942, will direct the newly created staff unit. Mr. Ware said the reorganization, under consideration since early 1958, centralizes responsibilities and planning in the operating and staff areas where such concentration is advisable.

He explained that combining the phosphate divisions "will facilitate expansion to meet the demand for phosphate materials." The two divisions operate in the same markets in some cases, he said, and phosphate rock produced by the minerals division is used to make phosphate concentrates produced by the phosphate chemicals division. Mr. Moyers said the phosphate consolidation would not affect the company's sales organization in the various markets. The new research, engineering and development division will incorporate five groups under Dr. LeBaron: research, patent management, mining and exploration, engineering and development.

## SEAWEED TRIALS

OTTAWA—Farmers in the Atlantic provinces have found seaweed compares favorably with barnyard manure as fertilizer. A kelp and rock weed mixture at the rate of 10 tons per acre was used in crop-growing trials at the Nappan, N.S., Experimental Farm and compared with an equal quantity of barnyard manure as a source of fertility in a barley and hay rotation. L. P. Jackson, agronomist, reports grain yields were 62 bu. per acre from the seaweed plots and 69 bu. from the manure plots. Average yields of hay over a two-year period were 2.20 tons per acre for both.

## Hungry European Corn Borers Take Part In \$1.8 Million Banquet of Ohio Crops

WOOSTER, OHIO—The healthy appetites of the European corn borer cost Ohio about \$1.8 million worth of crops in 1958, the Ohio Agricultural Extension Service reported.

The most hungry insects were reported in the Dayton area, the service said, but extensive damage occurred in the southwestern part of the state.

Actually, the \$1.8 million represents only about 1% of the total corn crop value, and, after considering that drouth or floods could do as much as 50% damage, the borers'

## Vertical Integration Expansion Foreseen by Agricultural Expert

OMAHA—Vertical integration in agriculture will continue to expand in the years ahead, Dr. Tyrus R. Timm, head of the department of agricultural economics and sociology at Texas A&M College, declared here recently. He spoke to a gathering of some 600 bankers at the American Bankers Assn.'s seventh National Agricultural Credit Conference.

Because vertical integration can be accomplished either through private enterprise or by government action, Dr. Timm urged bankers "to do all you can to make private enterprise function successfully in whatever vertical integration it sponsors."

Vertical integration, a relatively new term in agriculture, is the linking together of two or more functions of the production and marketing system under one management through a contractual arrangement between, say, a farmer producing broilers and the processor who dresses and markets them. In effect, according to Dr. Timm, it combines more decisions into fewer hands, thus centralizing decision making, risk bearing, and supervision.

Dr. Timm views the widespread expansion of vertical integration as due to four basic factors in the economy: 1) belief in economic betterment; 2) scientific advancement; 3) the nation's strong monetary and credit system; and 4) a political system which permits freedom to change.

"This widespread growth of vertical integration in agriculture is indicative of the fact that change in America is a constant," he said. "The rate of change is variable."

The nature and extent of the growth of vertical integration in the future, Dr. Timm said, depend on the following:

1. Opportunities for more profit through additional ownership or contractual arrangements.
2. Opportunity for delivery of goods and services in specified quantity, form, quality, time, and place.
3. Opportunity for innovator (integrator) to benefit from rapid technological change.

Those farm products which likely will continue heavily integrated or rapidly become so in the future, he predicted, are: broilers, turkeys, hatching and commercial eggs, certain fruits and vegetables.

The group of products likely to be integrated the slowest are: cotton, food grains, feed grains and range livestock.

Addressing himself directly to the bankers in the audience, who represented all sections of the country, Dr. Timm said:

The very nature of your business, as well as the great respect which farm people hold for your advice and counsel, requires you to "bone up"

on vertical integration in terms of your own community.

Here are a few things which you may want to include:

1. How much vertical integration can producers afford to accept without losing effective bargaining power? If the producers feel helpless in bargaining as individuals, will they form a cooperative, bring pressure through their farm organization, or join a labor union?

2. If large numbers of local producers do enter into integrated arrangements, reappraise the opportunities of market outlets for the remaining independent producers.

3. Vertically integrated marketing arrangements do not necessarily raise the producer's income. It depends upon the nature of consumer demand, the degree of competition among the marketing agents, and the number of farmers producing for this particular market.

4. Check with the procurement division of large chain stores and other mass buying marketing agents to determine whether purchase policies and procedures in terms of what's wanted, when, where, and how to fit the pattern of production in your area.

5. Inquire of agricultural economists in Federal Reserve Banks and land-grant colleges about studies of the economy of scale resulting from the combining of agricultural enterprises and functions.

6. If the potential for additional profit through vertical integration is readily apparent, discuss with farm and business leaders the relative opportunities for reaping these benefits by having: (a) large producers meet the market demand, (b) producers form a cooperative to assure certain deliveries, or (c) the largest farmers subcontract some of the processes to small farmers.

7. Remember that partial integration may be profitable to commercial farmers who are in a position to perform additional functions efficiently.

8. Make a thorough investigation of the credit rating of the integrator who guarantees producers that he will buy certain inputs and also take the finished product at a given price.

9. Find out whether some of your bright young farmers can enhance their income by supervising on a part-time basis certain management practices which the less efficient producers will be expected to follow.

10. Encourage farmers to determine whether they can obtain better technical advice from county agents and vocational teachers than from commercial concerns. Technical assistance often is an integral part of the integrated package.

11. Have producers think through other uses which they might make of the capital improvements tied in with the integrated program in the event the program failed.

12. Help officers and directors of local farmer cooperatives decide whether it is wise to add additional facilities and extend credit in order to meet the requirements of an integrated market.

13. Remind each producer that if he signs a contract he should read all of it, including the small print, carefully.

14. Seek a clear understanding among both small and large banks involved in the integrated program of their intentions and responsibilities.

15. Be aware of the fact that individual farmers place different values on freedom of choice and the importance of security. Their individual circumstances will have a lot to do with it.



## Progress Report

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## SERVICE

(Continued from page 1)

important and indispensable for certain crops, in specified quantities at appropriate times, but deviating from official label directions in advising growers may endanger both human health and livestock.

**"Do not try to overrule the judgment of agricultural experts and pharmacologists."**

On the other hand, Mr. Stanfill recognized that some growers do not have the proper respect for carefully devised directions and recommendations. A few let pesticides drift from one field to another or in desperation apply them to a crop too near harvest time, or to a crop for which the pesticide is not intended.

"Such rugged individualism is as ill-advised as ignoring the stop signals and bell ringing at a railroad crossing," Mr. Stanfill said.

The speaker reviewed the provisions of the Miller Amendment and sketched the machinery of enforcement. He mentioned a few instances of non-compliance to point up the serious consequences of failure to observe the rules.

Dr. Stacy B. Randle, state chemist at Rutgers, followed Mr. Stanfill on the program and added some thoughts of his own about dealer responsibility. He held inadequate directions on a label to be inexcusable and said his personal feeling was that a dealer has no right to stock a product not adequately labeled.

**A dealer owes his customers information and service, in Dr. Randle's view. He said he believed a grower would rather buy from a dealer who gives service than from a dealer who cuts prices and gives no service.**

Other speakers, members of the experiment station and extension service staffs, discussed in detail some of their experiences during the recent growing season and outlined recommendations for next year.

Dr. Leland G. Merrill, extension entomologist, said alfalfa weevil still ranks as the worst forage pest in New Jersey. To clean up the weevil, along with pea aphid and spittlebug before first cutting, he recommended heptachlor plus malathion or parathion in alfalfa. To kill spittlebug only in clovers and mixed hays the recommendation is heptachlor or methoxychlor.

Nematodes got a going over from Dr. Martin T. Hutchinson, research entomologist who heads the station's special nematode committee, and Dr. G. David Lewis, pathologist, who discussed nematodes in relation to diseases.

Research is being concentrated on basic control methods, Dr. Hutchinson said. Studies have shown that there are specificities among materials and ability to penetrate roots. For example, some work well in applications to snapdragon roots, but not to chrysanthemum roots.

He suggested that the nematode problem eventually will be licked by breeding for nematode resistance, noting the limited success already attained in tomatoes and peppers. Meanwhile, growers will depend on chemicals and crop rotations for control.

Nematodes have two ways of making serious trouble, according to Dr. Lewis. Either they cause distortions such as galls to make alteration in plant tissue, or they do enough damage to allow disease organisms to get in and make an indirect attack. Sting and root knot nematodes, for example, can increase the plant's susceptibility to fusarium wilt.

Some nematodes have more distressing characteristics than others, Dr. Lewis said. In the case of the cyst nematode the dead female encased in a cuticle may contain a mass of eggs than can remain in the soil

and hatch under favorable conditions after 15 years.

**And the root knot nematode, worse in the South than in New Jersey, is such a tough enemy because the female needs no male to fertilize her eggs, and just one egg can start a whole new population of nematodes.**

Researchers in other states have shown that nematodes carry viruses, Dr. Lewis concluded.

In discussing vegetable insect pests, Dr. Merrill said he and his associates are taking a special look at depressed yields after use of ethylene dibromide as a soil fumigant. Last season was wet and cold, and so he speculated that soil aeration after using EDB is especially important under these conditions.

He blamed grower carelessness in some instances of cabbage looper control failure. Variations in the width of rows made drip nozzles miss their targets, and when coverage was not good enough looper control failed.

Vegetable diseases could have been a lot worse during the wet growing season without the repeated sprays necessary to save crops, Dr. Spencer H. Davis, extension plant disease specialist, reported. He credited maneb, for example, with considerably lessening the effects of the downy mildew attack on lima beans. And growers who killed striped cucumber beetles early had less trouble from bacterial wilt.

Diazinon has been successfully used to treat bentgrass lawns for hairy chinch bug, reported Dr. William E. Collins, extension entomologist with responsibilities for household and garden pests. Remaining as a major problem is the German cockroach, which resists chlordane, used successfully against other roaches, he said.

Peach canker, newest and worst peach disease problem in the state, is damaging trees, but only a trace of it has been found on fruit, according to Dr. R. H. Daines, research pathologist. The 1959 spray schedule calls for a special canker spray at the delayed dormant stage.

This is made of copper sulfate, hydrated lime, superior type self-emulsifying oil and mono calcium arsenite or lead arsenate. The mixture roughens wood somewhat, but is the best combination for canker control, Dr. Daines advised. It is followed with 6 lb. of actual sulfur at 7-day intervals through the shuck-split stage, and then continuing with a standard brown rot schedule with 6 pounds of sulfur through harvest.

Handling the weed control section of the program were Dr. Richard Ilnicki, U.S. Department of Agriculture weed control researcher stationed at Rutgers, and Dr. Donald A. Schallock, extension weed control specialist. They went into the chemical structures of 2,4-D and related materials and then supplied answers to questions typical of those that farmers ask dealers, fieldmen and salesmen.

## SCHEDULE FRUIT SCHOOL

WOOSTER, OHIO—Many of Ohio's leading orchardists are expected to attend the annual fruit school on Dec. 1-3 at the Ohio Agricultural Experiment Station here. "This slack season is an excellent time for anyone interested in apples, peaches, pears or berries to catch up on new information," says Dr. F. S. Howlett, chairman of the department of horticulture. Many phases of the business are reviewed, including varieties, thinning, pest control, storage and marketing. Guest speaker at the event will be Dr. L. P. Batjer of Wenatchee, Wash., who is a leading authority on apples.

## Weed Control Queries Aired At Rutgers Pesticide Meeting

NEW BRUNSWICK, N.J. — Some typical questions by farmers about chemical weed control brought answers from weed control specialists during the Rutgers pesticide dealers' conference on Nov. 20.

Dr. Donald A. Schallock, extension weed control specialist, and Dr. Richard Ilnicki, U.S. Department of Agriculture weed control researcher stationed at Rutgers, gave a review of some of the theory behind hormone-like materials such as 2,4-D while giving practical answers to queries likely to be fired at salesmen and fieldmen.

They paid their respects to some of the newer entries in the weed control field, but chose to discuss the hormone-like chemicals in their belief that compounds such as 2,4-D and 2,4,5-T will lead the list of such chemicals for many years.

They pointed out also that the emphasis is timely because new analogues of 2,4-D and 2,4,5-T are finding new and significant uses in controlling weeds.

Among typical questions Dr. Schallock and Dr. Ilnicki posed, and their answers, were these:

**What factors determine the choice of pre- or post-emergence applications?**

On light soils, use post-emergence to prevent damage due to leaching. Where annual grasses are a problem use pre-emergence. (Suggested for trial use only next year, 1½ lb. of Simazine in 20 to 40 gal. of water. Trial use advised until effect of residue on crops which follow is investigated.)

On fields usually infested, pre-emergence treatments are advised.

Use post-emergence as a follow-up or emergency treatment.

On light soils, substitute 1 lb. of 2,4-D amine for 1½ lb. of 2,4-D ester pre-emergence.

**Is volatility of 2,4-D materials of serious importance?**

Drift of spray droplets is more often the cause of injury.

Chances of injury have been reduced with introduction of "low volatile" esters.

**Why are rates and materials different for pre- and post-emergence treatments?**

The ester is an oil emulsion that remains on the soil to kill weeds as they emerge.

A higher rate for pre-emergence is necessary to obtain residual control.

**What is the present status of 2,4,5-T?**

For clover control in lawns.

Amine form useful in orchards and near sensitive crops.

Still most widely used in combination with 2,4-D in brush control.

Occasionally 2,4,5-T is replacing brush killer mixture for frills, stump and dormant sprays.

**Do the butyric forms of 2,4-D and MCP differ from the acetic forms?**

Post-emergence applications of 2,4-DB and MCPB kill many weeds such as wild mustard, pigweed and lambs-quarter, but do not injure alfalfa, red clover and birdsfoot trefoil.

**In what situations should 2,4,5-TP be used?**

To control certain woody and herbaceous plants (Japanese knotweed, for example) in pastures, ditch banks, fence rows, and rights of way.

Oak species are readily controlled with a foliar spray.

Chickweed and certain aquatic weeds also are controlled by this material. But a trial sprinkling with the needed volume of plain water is advised as a trial run to be sure no more than the correct amount of chemical is applied. Not recommended in situations surrounded by roses and other delicate plants.

**Where does TBA fit into weed control?**

Either 2,3,6-TBA or PBA (polychloro) effective on field bindweed, horsenettle, quackgrass and certain woody plants not easily controlled.

May be used selectively in corn.

At heavier rates TBA is non-selective. It is absorbed through leaves and roots. Dr. Ilnicki emphasized its persistence. Used this year, it may kill next year's soybeans. At 10 lb. an acre, it'll act as a sterilant, killing everything for two years.

**Can sprayers be cleaned thoroughly of 2,4-D materials?**

Researchers at Rutgers have been using a "bicycle" sprayer without once getting into trouble by following this routine:

(1) Spray out unused material. Refill with water and leave overnight so material won't dry on sides.

(2) Spray out water and refill with clean water. Add detergent or household ammonia.

(3) Scrub sides, and be sure to clean the top of the barrel especially. Circulate through pump. Pay special attention to nozzles and strainers.

(4) Pump out and rinse.

(5) Repeat the whole operation. Sprayers cleaned like this can be used for field crops, but their use is not advised for vegetables.

**Can I save work by mixing herbicides with other pesticides?**

Mixing with other pesticides offers many attractions, but should be approached with caution.

Consult manufacturers and follow their advice.

Unless you have specific information, don't mix pesticides.

(In response to a question from the floor about mixing nitrogen with weedicides, Dr. Ilnicki said no one has proved nitrogen is helpful in such a case. But this doesn't mean it won't work. The farmer who tries this is on his own.)

**Will granular hormone materials be used extensively?**

Mixed with fertilizer for lawn use, materials may be safe and effective if the fertilizer is spread accurately.

Granular 2,4-D and 2,4,5-TP are showing excellent control of aquatic weeds. The stable granules settle to the bottom of the pond in early spring and kill many weeds as they begin to grow.

## Chemical Spray Kills Unwanted "Cull" Trees, Minnesotan Discovers

ST. PAUL—Frank D. Irving, University of Minnesota forester, has learned that where there are a number of poor trees to get rid of, and you don't want to actually cut them, the best way is to spray 2,4,5-T around the lower three feet of the trunk in mid-summer.

Where there are only a few trees to kill, it may be easier to simply put a tablespoonful of ammate crystals in axe-cut notches, spaced 4-6 inches apart around the trunk and about 18 inches off the ground, Mr. Irving said.

Either method will both kill the tops and prevent the roots from resprouting. But where you want to kill the old tree but still have sprouting for regrowth, it's necessary to mechanically "girdle" the tree.

Mr. Irving tried all three methods, both in July and October, on black oaks in southern Minnesota two years ago. By summer, 1958, all July treatments showed good top kill, regardless of size of tree. Kill wasn't as good for the chemical treatments in October, although it made no difference with mechanical girdling. Both chemicals also prevented sprouting, but 40-80% of the girdled trees had sprouts.

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## TVA Develops Process For Making Slag as Phosphate Byproduct

KNOXVILLE—In an effort to find new uses for the byproducts of phosphate fertilizer production Tennessee Valley Authority has developed a process for making lightweight concrete aggregate by expanding electric-furnace slag, W. C. Scott, TVA Development Branch, reported recently to a sectional meeting of the American Institute of Chemical Engineers.

Mr. Scott said the need for lightweight aggregate in concrete block manufacture and other concrete construction provides a large and growing market.

"The slag produced is sold to the concrete block industry," he said. "This material is filling a serious need for lightweight aggregate in this part of the country. One of the main objectives of TVA developmental work of this type is to make readily available to industry information that can be used to reduce the cost of phosphate fertilizers. Development of new uses for byproducts, such as expanded slag, is one way of accomplishing this objective."

"The major phosphorus producers have followed closely the TVA work on slag expansion. One company located in Florida has built a plant on the basis of our development and is marketing expanded slag in that area. Also, one company in Tennessee has entered the field and is shipping . . . the material to concrete block producers."

He said six companies and TVA produce elemental phosphorus by the electric-furnace process in this country. Total annual capacity of all production facilities is over 350,000 tons of phosphorus, corresponding to the production of over 2,500,000 tons of byproducts slag annually.

## One Treatment Gives Season Weed Control

GILBERTSVILLE, KY.—Forest tree seed beds at Kentucky Dam Nursery, near here, have received all-season weed control from one application of a new chemical soil fumigant, according to John P. Rhody, assistant director of nursery operations, Kentucky Department of Conservation, Division of Forestry.

Last fall the chemical, Mylone fumigant, was applied to two seed beds, and this spring 62 500-ft. seed beds were treated before trees were planted. Several areas were left untreated to provide a check of the chemical's effectiveness, Mr. Rhody said.

Weeds thrived in the untreated areas, while the treated seed beds remained relatively clean for the entire growing season and produced more trees because of the good weed control, he reported.

It was estimated by Mr. Rhody that it took ten times longer to keep the untreated beds clean by hand weeding than it took to maintain the treated beds weed-free. No accurate cost comparisons can be made at this time. However, it is known that the cost of treating the beds was far less than that incurred in weeding the non-treated beds. It was also noted that seedlings were destroyed and damaged during the weeding process in the non-treated beds.

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## Bunker Hill Options Washington Plant Site

KENNEWICK, WASH.—The Bunker Hill Co. has taken an option on property here as the possible site of its proposed \$10 million fertilizer plant, John Bradley, company president, announces.

The site is the only one under op-

tion so far. It is between the Allied Chemical and Dye Corp. and Phillips Pacific chemical plants.

The company, which produced lead and zinc at Kellogg, Idaho, previously announced plans to use by-products of the mining operations to supply a fertilizer plant in the Northwest. The proposed plant would have a capacity of 200,000 tons annually.

The company hopes to have the

facility in production by July, 1960.

Selection of Bunker Hill's fertilizer site, said Mr. Bradley, involves delicate balancing of cost factors, including freight on phosphate rock and sulfuric acid. The logic of the Kennewick site indicates how chemical plants develop in groups rather than singly and how important to Kennewick is the Phillips plant, first big Northwest producer of ammonia.



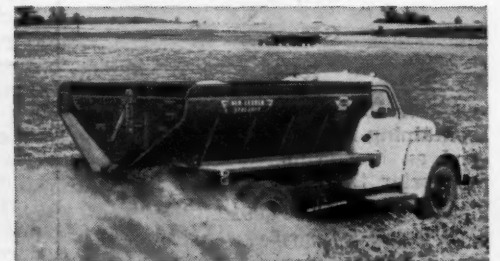
## Wide 24" Conveyor and Twin Spinners Deliver Fast, Uniform Spreads!

Simple operation saves time and upkeep: set feedgate opening . . . start truck engine . . . start spreading!

The L-19S body is 6" higher and more heavily reinforced than other lime spreaders. This means bigger payloads, with less blowing and no body warp or twist. 45° angle side slopes help prevent bridging and permit a lower center of gravity, a more attractive appearance.

Typical of its quality construction are such exclusive features as: dust and moisture-sealed gears with Timken roller bearings, heavy-duty roller-type conveyor chain and an optional endgate that swings completely open for stock piling.

New Leader Engine-driven COMBINATION Spreaders are also available: Model L-22S with a 7.0 h.p. engine and Model L-32S with a 12.5 h.p. engine to deliver plenty of power for heavy applications of lime or fertilizer.

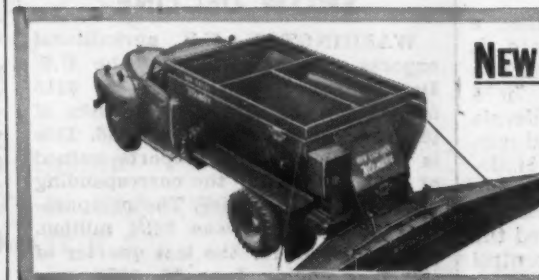


## NEW LEADER Model L-14S LIME SPREADER

is a high quality rig with a low price tag!

Cut your in-the-field costs with this simple to operate, easy to maintain spreader. Merely set the feedgate opening, start the truck, engage the PTO and start spreading! Material is delivered to the twin spinners over a wide 24" conveyor. Also available with a center dump for stock piling.

New Leader Engine-driven lime spreaders: Model L-52S has a 24" conveyor and is built for heavy-duty use. Model L-62S with a 30" conveyor is available for widespread applications. Both spreaders can also be used for fertilizer.



## NEW LEADER L-42S Mobile Blender Accurately Blends and Spreads 3 Fertilizers At the Same Time!

Permits the operator to control both the amount of spread and ratio of 3 fertilizers depending on varying soil conditions! A 7 h.p. engine drives the twin spinners at a constant rate. A 36" belt-over-chain conveyor is powered from a driveshaft drive and synchronized to truck speed.

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ARK.—Truck Eqt. Co., Fort Smith, Springdale  
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DEL.—Bohr Spreader Service, Inc., Harrington  
FLA.—Henry W. Conibear, Lakeland  
G. C. Phillips Tractor Co., Inc., Birmingham and Prichard (Ala.)  
GA.—Brooker Truck Eqt. Co., Atlanta  
IDA.—Oscar Bennion, Murray (Utah)  
ILL.—D. H. Thomas & Son, Inc., Rockford  
Koste Mach. Co., Inc., Robertson (Mo.)  
Truck Eqt. Co., Peoria  
IND.—Emmert Trailer Corp., Elkhart  
South Side Eqt. Co., Inc., Indianapolis  
Mulzer Brothers, Tell City, Ind.  
IOWA.—Badger Body Mfg. Co., Omaha  
Snyder-Meylor Co., Sheldon  
Wendler-Kraus Eqt. Co., Inc., Cedar Rapids  
KANS.—Perfection Truck Eqt. Co., Wichita

Write for illustrated bulletin.

Dealers Body & Eqt., Kansas City  
Perfection Spring & Eqt., Kansas City  
KY.—Mulzer Brothers, Tell City (Ind.)  
Md.—Bohr Spreader Service, Inc., Harrington (Del.)  
MICH.—Goes Seed & Eqt. Co., Saginaw  
Emmert Trailer Corp., Elkhart (Ind.)  
Ostrom-Johnson Co., Rice Lake (Wis.)  
Riedy-Manner Truck Eqt., Toledo (Ohio)  
MINN.—Snyder-Meylor Co., Sheldon (Iowa)  
Ostrom-Johnson Co., Rice Lake (Wis.)  
MISS.—A. P. Lindsey, Distr., Inc., Jackson  
MO.—Koste Mach. Co., Inc., Robertson  
Dealers Body & Eqt., Kansas City  
Perfection Spring & Eqt., Kansas City  
NEB.—Agrifirst Chem. Corp., Lincoln  
Snyder-Meylor Co., Sheldon (Iowa)  
NEV.—Lovelock Welding, Lovelock  
N.J.—Bohr Spreader Service, Inc., Harrington (Del.)  
N.Y.—H. O. Penn Mach. Co., Inc., New York

Westbury, L. I., and Poughkeepsie  
Schmitz Sales & Serv., No. Collins  
N.C.—O. H. Stanard, Raleigh  
N.D.—Snyder-Meylor, Sheldon (Iowa)  
OHIO.—Orran Hofstetter, Orrville  
D. L. Phillips, Damascus  
Riedy-Manner Truck Eqt. Corp., Toledo  
Schodorf Truck Body & Eqt. Co., Columbus  
PA.—Annville Body Co., Annville  
Ira D. Haines, Waynesburg  
D. L. Phillips, Damascus (Ohio)  
S.C.—O. H. Stanard, Raleigh (N.C.)  
S.D.—Snyder-Meylor Co., Sheldon (Iowa)  
TENN.—Tennessee Distr. Co., Donelson  
UTAH.—Oscar Bennion, Murray  
VA.—O. H. Stanard, Raleigh (N.C.)  
W. VA.—Farmers' Truck & Impl. Co., Buckhannon  
D. L. Phillips, Damascus (Ohio)  
WIS.—Brooks Industrial Sales, Inc., Sun Prairie  
Ostrom-Johnson Co., Rice Lake

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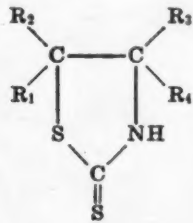
**HIGHWAY EQUIPMENT COMPANY**  
642 D. Ave. N. W. Cedar Rapids, Iowa



## Industry Patents and Trademarks

2,860,962

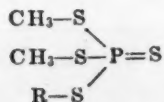
**Method of Defoliating Plants.** Patent issued Nov. 18, 1958, to Henry Bluestone, Cleveland Heights, Ohio, assignor to Diamond Alkali Co., Cleveland, Ohio. A method of defoliating plants which comprises applying to the plants, in an amount sufficient to effect the desired defoliation, a compound having the formula



wherein  $R_1$ ,  $R_2$ ,  $R_3$ , and  $R_4$  are selected from the group consisting of hydrogen alkyl, aryl, alkaryl and aralkyl radicals, wherein the alkyl radicals contain from 1 to 4 carbon atoms.

2,861,023

**Fungicidal Compositions and Methods of Destroying Fungi Employing Trialkyl Tetrathio phosphates.** Patent issued Nov. 18, 1958, to Carleton B. Scott, Pomona, and John W. Yale, Jr., Yorba Linda, Cal., assignors, by mesne assignments, to Collier Carbon and Chemical Corp. A fungicidal composition comprising as the essential active ingredient a dimethyl alkyl tetrathio phosphate of the general formula:



wherein R represents an alkyl group containing from 1 to 6 carbon atoms, and an inert fungicidal adjuvant as a carrier therefor.

2,861,091

**Manganous Dimethyldithiocarbamate Stabilized with Zinc Dimethyldithiocarbamate.** Patent issued Nov. 18, 1958, to Robert O. Beauchamp, Jr., Wilmington, Del., and Thomas P. Johnson, Atlanta, Ga., assignors to Tennessee Corp., New York, N.Y. A co-precipitated intimate mixture of manganous and zinc dimethyldithiocarbamates containing from about 50% to 70% zinc dimethyldithiocarbamate having stability against spontaneous combustion, deterioration, and loss of fungitoxicity. In a process for stabilizing manganous dimethyldithiocarbamate against spontaneous combustion, deterioration, and loss of fungitoxicity, the steps of mixing an aqueous solution of inorganic soluble manganous and zinc salts and an aqueous solution of a chemical compound selected from the group consisting of alkali metal dimethyldithiocarbamates and alkaline earth dimethyldithiocarbamates until a slurry is obtained, filtering the slurry to remove precipitated manganous and zinc dimethyldithiocarbamates, washing the precipitated manganous and zinc dimethyldithiocarbamates with water, and then drying the manganous and zinc dimethyldithiocarbamates.

### Industry Trade Marks

The following trade marks were published in the Official Gazette of the U.S. Patent Office in compliance with section 12 (a) of the Trademark Act of 1946. Notice of opposition under section 13 may be filed within 30 days of publication in the Gazette. (See Rules 20.1 to 20.5.) As provided by Section 31 of the act, a fee of \$25 must accompany each notice of opposition.

**Dubl-Deth**, in capital letters, for insecticide. Filed June 25, 1956, by Destruol Corp., Pasadena, Cal. First use May 14, 1956.

**Zoalene**, in capital letters, for nitrophenyl compound for use principally as an active ingredient in parasiticide compositions. Filed Aug. 19, 1957, by the Dow Chemical Co., Mid-

land, Mich. First use March 27, 1957.

**Detamide**, in capital letters for insect repellent. Filed Jan. 6, 1958, by Cowles Chemical Co., Cleveland, Ohio. First use Oct. 22, 1957.

**Eptam**, in capital letters, for ingredient of a herbicide for experimental use only. Filed Feb. 3, 1958, by Stauffer Chemical Co., San Francisco, Cal. First use Jan. 23, 1958.

**Usplos**, in capital letters, for fertilizers. Filed May 1, 1958, by Tennessee Corp., New York, N.Y. First use Aug. 15, 1957.

**Veon**, in capital letters, for brush and weed killing compositions. Filed Aug. 19, 1957, by the Dow Chemical Co., Midland, Mich. First use April 17, 1957.

**Inverton**, in capital letters, for brush and weed killing compositions. Filed Aug. 19, 1957, by the Dow Chemical Co., Midland, Mich. First use May 24, 1957.

**Inseo**, in large black block letters, for insecticides and fungicides. Filed Sept. 27, 1957, by Insect Control Sales & Service, Candor, N.C. First use Sept. 1, 1954.

**Trolene**, in capital letters, for organic phosphorus compound principally for use as an active ingredient in parasiticide, especially insecticidal compositions. Filed Oct. 23, 1957, by the Dow Chemical Co., Midland, Mich. First use Oct. 1, 1957.

**Narlene**, in capital letters, for organic phosphorus compound principally for use as an active ingredient in parasiticide, especially insecticidal compositions. Filed Feb. 10, 1958, by the Dow Chemical Co., Midland, Mich. First use Dec. 11, 1957.

**Tabatrex**, in capital letters, for ingredient, consisting wholly or predominantly of Di-N-Butyl succinate, for further manufacturing use in insect repellent compositions. Filed April 3, 1958, by Glenn Chemical Co., Chicago. First use March 24, 1958.

**HH**, in hand drawn block letters, one solid black and one outlined bordered on top and bottom with black rule, for fertilizers. Filed April 20, 1958, by the Hubbard-Hall Chemical Co., Waterbury, Conn. First use Jan. 7, 1957.

**SuperGro**, in hand drawn script, with black shading, for organic soil builder and conditioner, the product of packing house animal compost, natural minerals from decomposed marine live and cultured soil microorganisms. Filed May 23, 1958, by Northern Field Seed Co., Winona, Minn. First use Sept. 1, 1951.

### Scientist Discusses "Integrated" Pest Control

SAN JOSE, CAL.—Integration, a word often in the news of late, is now being applied to pest control in the deciduous fruit industry. In a speech to delegates to the California Farm Bureau Federation annual convention at San Jose, James K. Holloway, specialist in parasite introduction investigations for the U.S. Department of Agriculture explored the possibilities of more efficient control of costly pests in fruit production.

Integration, as used by Mr. Holloway, deals with the inter-balance of artificial and biological controls.

Cultural practices, involving proper timing of irrigation, sprays and cultivating, could be very important in an integrated control program, according to Mr. Holloway, as they may be able to retard the pest and favor biological control.

"If, by further study, we can learn to partially control pests artificially without destroying their natural enemies," said Mr. Holloway, "and in fact encourage multiplication of those natural enemies, we would be approaching integrated control. The problem, though complex now, is definitely worthy of our research and consideration."

## Texas Farmer Tells "Only Way to Grow Cotton Profitably"

MIDLAND, TEXAS—The only way to produce cotton at a profit is to fertilize the land heavily and practice rigid control of insects. This is the opinion of one of Midland County's top farmers, Clayte Graham.

This year his cotton will average around two bales per acre, while some parts of the field will be much higher. Mr. Graham had 300 acres in cotton and the production costs were approximately \$30,000. It took this much to make the crop until harvest time. Harvesting averages about \$60 an acre or more.

Mr. Graham fertilized with 150 lb. of anhydrous ammonia, 150 lb. of phosphate and 100 lb. of potash per acre. In warding off insects he hired an aerial contractor to spray the field eight times. The contractor charged \$1 an acre and cost of materials was \$1.50 per acre.

"These production costs look high and they are," he said. "Poisoning is a must in this area, but a man could grow cotton without fertilizer. He wouldn't grow much, though, maybe a bale to the acre. We believe it most profitable to spend one bale per acre in order to get another one free. The farmer who didn't fertilize would have less than a half bale in the clear."

Mr. Graham and his neighbors used potash for the first time in 1958 and think it paid good dividends. There was less fungus trouble and the plants matured earlier.

### Commercial Solvents Names Neal Van Kirk Traffic Head

NEW YORK—Neal Van Kirk has been named general traffic manager of Commercial Solvents Corp., announced W. Ward Jackson, vice president.

Mr. Van Kirk was formerly associated with Darling & Co. in a series of increasingly responsible traffic management positions. Prior to coming here to join Commercial Solvents, he was located in Chicago.

A licensed practitioner before the Interstate Commerce Commission since 1954, Mr. Van Kirk has experience in handling rate adjustment and related matters with government rail and truck rate regulation bodies on all levels, Mr. Jackson said. He is a graduate of the College of Advanced Traffic in Chicago where he majored in traffic management and interstate commerce law.

### AGRICULTURAL EXPORTS SHOW DECLINE

WASHINGTON—U.S. agricultural exports are estimated by the U.S. Department of Agriculture at \$915 million for the first three months of the year beginning July 1, 1958. This is 5% below actual exports valued at \$962 million for the corresponding quarter a year earlier. The comparable 1956-57 total was \$980 million. The valuation for the last quarter of the year ending June 30, 1958, was \$977 million. The first quarter 1958-59 estimate is based on an actual value of \$609 million for July and August, and an estimated value of \$306 million for September. Although exports of U.S. feed grains, rye and edible vegetable oils in July-September, 1958, were well ahead of a year earlier, the gains were more than offset by sharp reductions for certain commodities, chiefly cotton, flaxseed, tallow, dairy products and hides and skins.

U.S. Agricultural Exports July-September, 1957 and 1958			
Commodity	1957 \$ million	1958 \$ million	Per cent change
Cotton	170	130	-24
Grain and feeds	307	345	+12
Wheat and flour	173	165	-5
Feed grains	85	125	+47
Rice, milled	24	25	+4



**NEW PACKAGE**—In an attempt to increase the merchandising appeal of its packaging, plus lowering the cost of producing the package, the Davison Chemical Division of W. R. Grace & Co., Baltimore, reports that it has been successful in both counts. The new design, shown above, is on a kraft colored outer sheet. This eliminates the relatively expensive outer sheet of orange paper previously used, the company said.

### Western Celery Mosaic Regulation Change Asked

SACRAMENTO, CAL.—At the request of celery growers in the Arroyo Grande Valley, Pismo, Oceano and Berros areas of San Luis Obispo County, the State Department of Agriculture proposes to change the regulations of the department pertaining to host-free districts and periods (western celery mosaic) in connection with the control of western celery mosaic disease in the four areas.

It is proposed to change the date of commencement of the celery free period in San Luis Obispo County from Jan. 10 to Jan. 1, starting in 1960, and the date of termination from the last day of Feb. to Feb. 14, starting in 1959. It is proposed also to change the period during which a permit is required to plant and maintain celery plants so that the period would be consistent with the proposed host-free period.

### Pacific Agro Named Nitroform Distributor

SEATTLE—Nitroform Agricultural Chemical Co. has appointed Pacific Agro Co. to handle sales for Oregon, Washington and Alaska. The arrangement was announced jointly by James M. O'Donnell, president of Nitroform, and Lee Fryer, fertilizer manager for Pacific Agro Co., a Seattle firm.

"After seven years of research and development work on urea-form nitrogen, we are ready to conduct vigorous sales activity wherever nitrogen is sold," Mr. O'Donnell said in making the announcement. "We are especially happy to enter the Northwest market and the new 49th state of Alaska."

The Nitroform materials are provided in three grades: (1) regular "Blue Chip" Nitroform for direct application; (2) Nitroform "M" for manufacturers as an ingredient in mixed fertilizers; and (3) "Powder Blue" Nitroform for suspension in water for spray application to turf—especially to golf greens.

### Missouri Meetings

COLUMBIA, MO.—A series of fertilizer dealer meetings has been scheduled for early next year by the Soil Fertility and Plant Nutrition Council of Missouri. They will be held at Kirksville and Canton Jan. 13, 20, 27 and Feb. 3; Mexico and Troy Jan. 14, 21, 28 and Feb. 4 and Farmington and Jackson Jan. 15, 22, 29 and Feb. 5.

### OHIO REPRESENTATIVE

WATERTOWN, MASS.—Fred E. Huss has been appointed as its exclusive sales and service representative in northwestern Ohio by Lewis-Shepard Products, Inc., Watertown, producer of electric fork lift trucks and related materials handling equipment. Mr. Huss has headquarters at 1039 Custer Drive, Toledo.





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## Canadian Fertilizer Sales Up 7.7% Over 1956-57

OTTAWA, CANADA—Sales of mixed fertilizers in Canada for the year ended June 30, 1958, amounted to 870,539 tons, reported Gordon Churchill, minister of trade and commerce. This was 7.7% more than the 808,251 tons sold during the 1956-57 period.

Including exports, Canadian sales amounted to 1,798,309 tons or 5% more than the preceding year.

The sales to Canadian users were broken down into 181,973 tons of materials sold and 688,566 tons of mixtures.

Production of fertilizer materials (excluding anhydrous ammonia) in the period under review, including such items as ammonium nitrate, ammonium phosphate, ammonium sulphate, superphosphate and cyanamide, amounted to 1,337,586 tons compared with 1,174,615 tons in the preceding year. The output of mixed fertilizers increased to 736,113 tons from 729,037 manufactured the previous year.

Imports of fertilizers (excluding anhydrous ammonia) amounted to 946,231 tons compared with 920,157 tons during the previous fertilizer year. The more important items which were brought in were natural phosphate rock, 572,000 tons; superphosphate, 167,676 tons; muriate of potash, 129,388 tons; nitrogen solution, 27,820 tons and sulphate of potash, 17,812 tons. The phosphate rock was used, of course, in Canadian fertilizer plants to make superphosphate and ammonium phosphate; similarly, most of the other imported materials were used in making mixed fertilizers.

Exports of materials amounted to 885,064 tons including 10,942 tons of anhydrous ammonia, a 3.7% increase over the previous year's total of 854,331 tons which included 9,448 tons of anhydrous ammonia. Exports of mixed fertilizers amounted to 42,706 tons a decrease of 14.1% over the previous year's total of 49,728 tons.

## Research in the News

Illinois agronomists remind us that soil fertility not only provides a better living for farmers, but it cuts erosion losses and protects the soil.

They point out that lime, phosphate, potash and nitrogen can help farmers grow higher yields per acre. These, in turn, enable farmers to cut their costs of production and get more income per bushel, per acre and per hour of work.

The Illinois soils men say that fertility is equally valuable as a soil saver.

Here is how agronomists at the Dixon Springs, Ill., experiment station sum it up:

"High soil fertility nudges winter covers of small grains into leafier, denser blankets against runoff.

"Pasture sods grow thicker, with more numerous, healthy roots to grasp the soil.

"Corn and grain produce thicker stalks and a spongy stubble to mulch and protect the soil."

All these benefits spring from soil fertility, the agronomists point out.

Farmers can get much more profitable returns per hour for their crop labor by using fertilizer on their present acres than by purchasing more land that they won't improve, reports Dr. Edmond Hartmans, University of Minnesota, farm management specialist.

With the use of more fertilizer, each acre can do a better crop producing job, says Dr. Hartmans.

As an example of this, he points out that a 120-acre "good yielding farm" with a heavier fertilizer program might produce 70-bu. corn yields, 60-bu. oat yields and three tons of alfalfa per acre.

An "average yielding" 160-acre farm where less fertilizer is used, might yield only 50 bu. of corn, 40 bu. of oats and two tons of alfalfa per acre, he says.

On the basis of present prices, the crop labor return from the smaller farm would be \$2,700 per year, after deducting the cost of fertilizer and operating expenses. On the larger farm, the crop labor return would be \$2,800.

The farmer working the 120-acre farm would average \$3.70 per acre, compared to only \$2.67 for the operator of the larger farm. And, figured another way, the farmer on the larger acreage would have 350 more work hours, but make only \$100 additional in crop labor return.

Electronic tabulating equipment now used by Purdue University agronomists enables them to prescribe more closely fertilizer ratios for various soils and crops in Indiana.

Additional knowledge of the soils of Indiana has been gained from studying the results of more than 67,000 soil samples tested at Purdue. This research is aimed at establishing relationships between soil test levels and other soil characteristics such as topography, drainage, soil type and parent mineral material. The frequency of occurrence of various acidity, available phosphorus and available potassium levels in different soil types and in different regions in Indiana can also be determined.

Roy Bronson and S. A. Barber, Purdue agronomists, feel this research is proving to be a valuable guide for general fertilizer recommendations where actual soil test results are not available on which to base sound fertilizer recommendations.

Purdue soil specialists can now tell county extension agents and local agricultural consultants what percentage of the soils in their areas are deficient in nitrogen, phosphorus, potassium or lime and to estimate the amount of fertilizer and lime which should be used for that area.

Mr. Bronson and Mr. Barber have prepared Research Bulletin 664, "Soil Fertility Maps of Indiana," and Mimeo AY-142, "Frequency Distribution of Soil Tests in Indiana by County and Soil Group for 1952 to 1954." These two publications will serve as a guide for fertilizer and lime applications where soil test results are not available. Indiana residents may obtain copies free by writing the agricultural publications office, Purdue University.

### JOINS AIR GROUP

FRESNO, CAL.—Agair, Inc., has joined the California Agricultural Aircraft Assn., and is represented by R. E. Hyde of Dos Palos, Cal.

## Books on Fertilizers And Their Use

### FOREST FERTILIZATION

Donald P. White and Albert L. Leaf

A bibliography, with abstracts, on the use of fertilizers and soil amendments in forestry. Useful to those interested in prospects of a plant food market in forest areas, the book resulted from a special two-year study at the college of forestry, Syracuse University, Syracuse, N.Y., under sponsorship of the Nitrogen Division of Allied Chemical & Dye Corp. The book contains 300 pages, 700 references, with abstracts, and covers the period from 1865 through 1956. In-\$3.00

### SOIL FERTILITY AND FERTILIZERS (1956)

Samuel L. Tisdale and Werner L. Nelson

An advanced college text, for juniors and seniors, following backgrounding course in soils. Covers elements required in plant nutrition, their role in plant growth, and the soil reactions to these nutrients. Several chapters on manufacture, properties and agronomic value of fertilizers and fertilizer materials. Latter part covers soil fertility evaluation and use of fertilizers in sound management program. 430 pages, cloth bound .....\$7.75

### PLANT REGULATORS IN AGRICULTURE

Dr. Harold B. Tukey

Published September, 1954. A text book giving background material for county agents, farmers, citrus growers, nurserymen, gardeners; providing fundamentals and general principles; covers encouragement of roots by plant regulators, control of flowering and fruit setting, parthenocarp, abscission, prevention of preharvest fruit drop, delaying foliation and blossoming, maturing and ripening, inhibition of sprouting and weed control. Brings together specialized knowledge of 17 authorities in the field, with two chapters written by Dr. Tukey, head of department of horticulture at Michigan State College. 269 pages .....\$6.50

### THE CARE AND FEEDING OF GARDEN PLANTS

Published jointly by the American Society for Horticultural Science and the National Plant Food Institute.

An entirely new, one-of-a-kind book. It is designed to acquaint readers with nutritional deficiency symptoms or "hunger signs" of common yard and garden plants including lawn grasses, shrubs, flowers, garden vegetables, and cane and tree fruits. It stresses plant "feeding," or "what makes plants grow." Sixteen of the nation's leading horticultural authorities collaborated in its preparation. Cloth bound, 300 pages of text and illustrations including 37 pages in full color .....\$3.00

### AUXINS AND PLANT GROWTH

A. Carl Leopold

A 366-page book, complete with bibliography, appendix, and index, discusses the fundamental and applied aspects of growth hormone and synthetic auxin action in plants. These are of interest to all workers in agricultural chemicals—for weed control, flowering control, fruit set, flower or fruit drop and plant propagation. The text is divided into two sections, (1) fundamentals of auxin action, and (2) auxins in agriculture. These cover developmental effects of auxins, the physiological and anatomical effects of their application, the chemical nature of growth regulators, and methods of applying auxins and their persistence in plants and soils. Other subjects covered: rooting, parthenocarp, flower and fruit thinning, control of pre-harvest fruit drop, flowering, dormancy and storage, herbicides, miscellaneous uses of auxins, and potentials of auxins and auxin research. Published by University of California Press.....\$5.00

### ECONOMIC AND TECHNICAL ANALYSIS OF FERTILIZER INNOVATIONS AND RESOURCE USE

By E. L. Baum, Earl Heady, John Pesek and Clifford Hildreth.

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## Field Spreading Service Boosts Sales for Wyoming Firm

By JESS BLAIR



**GETTING OUT** on the farms with his fertilizer spreaders has brought Victor Deneis (above), manager of the Platte Valley Fertilizer Co. in Torrington, Wyo., a big increase in sales. He says aggressive selling and customer service are two main keys in building a farm chemical business.

In the prosperous farming area around Torrington, Wyo., much of the fertilizer and other chemicals used are bought from the Platte Valley Fertilizer Co. This firm, in operation here only three years, has built a very profitable business by going into the custom spreading of fertilizer.

The firm decided that taking the material to the farm and spreading it on the land would increase sales. The method has proved very popular. The manager is Victor Deneis, a young man who has been in the area only two years. His entire working day is devoted to the sale and application of fertilizer and other farm chemicals, and he has helped bring a steady increase in sales this year.

The firm has two large spreader rigs that will cover four rows of corn or six rows of beets. Using liquid fertilizer altogether, his drivers can cover around 20 acres a day with each rig. The charge for this is \$1.75 an acre plus retail cost of the material used.

"We may make a little profit on the machines," he said, "but mostly it comes from the sale of material. We also have two rental pull-type spreaders for which we charge 50¢ per acre. Some farmers prefer to do their own spreading, so they will rent one of these units for a day or so at a time."

In addition to the spreaders, the company offers another service to the farmer in the form of a storage tank. Mr. Deneis has eleven of these tanks, each holding 1,000 gal. of liquid, which are loaned to farmers who want to do their own fertilizing. A tank is carried to the farm on a company truck, and when the season is finished, it will be hauled back to the store. If a farmer uses a large quantity of fertilizer and intends to follow the same arrangement the

next year, then the tank will be left on the farm.

A prosperous fertilizer business cannot be built up on custom spreading alone, says Mr. Deneis. If this were true, then every dealer could get a few spreaders and make money by it.

"We believe in doing a good merchandising job and giving the farmer the kind of help that will make him more money."

One of these services is to take a free soil test of each field. Mr. Deneis does this himself, then sends the sample to the nearby agricultural experiment station where an analysis is made and recommendations of fertilizer given. The soil test costs are paid by the Platte Valley Fertilizer Co.

**This is of tremendous help, Mr. Deneis says, but a soil test is not infallible. The company found this out by using potash where none had been recommended. They found that on vegetables the supposedly adequate supply of potash in the soil was not available, and that the inclusion of potassium in the fertilizer mixture paid nice dividends.**

Knowing the cropping history of a place and the requirements of each crop to be grown are also needed information the dealer must learn. Mr. Deneis keeps records on most fields, and then checks at harvest time to see how much yields were increased.

"On some fields I learned that 60 lb. of 20-0-0 increased sugar beet yields by a ton per acre," he said. "At \$14 a ton for the beets, the farmer more than doubled his profit by using fertilizer."

**The company uses several liquid mixtures, all high in nitrogen or phosphorus or both. The most common ones are 20-0-0, 16-8-0 and 8-24-0. Each crop requires a different fertilizer, and also the previous fertilizer history of the fields is to be considered.**

Ordinarily Mr. Deneis recommends about 150 lb. of nitrogen and 50 lb. of phosphorus for corn. For beets he uses 60 lb. of nitrogen per acre and 200 lb. of phosphorus. Also potash is being included in some of the beet fertilizers.

"Some dealers just try to sell fertilizer," young Mr. Deneis said. "I think you've got to become interested in what the fertilizer will do. Find out what is needed, don't undersell or oversell and keep a close watch on what it is doing all through the year. In this way, after just one or two crops a dealer can learn a lot about fertilizer and cropping problems in his area."

**The company also is building a nice volume of sales on insecticides and weed killers. The valley is irrigated and each summer the insects seem to be on the increase. Know-**

(Turn to FIELD SPREADING, page 15)

## Demonstration Plots Help South Dakota Company Increase Fertilizer Business

One of the most difficult things in selling farm chemicals is to convince the farmer that he needs them, that they will make him a profit. There are many ways of convincing customers. The most effective one for the Dakota Improved Seed Co. of Mitchell, S.D., has been the demonstration plot.

"Our work has been mostly with noxious weeds," said Allan Anderson, in charge of farm chemicals. "Farmers had previously killed weeds by hoeing and cultivation so long, they did not take readily to chemical weed killers. By using demonstration plots where everyone can visit them, we've had good luck in changing people over to a complete chemical program."

The Dakota Improved Seed Co. is an organization that operates through dealers only. The only retail sales are made to farmers in the Mitchell area. Plots are scattered in several parts of the state, but in Mitchell County there are 10. These are located near the public roads and include all types of cropland. Some are on hay field, on cultivated crops and in road ditches.

"The plots are each one rod square," said Mr. Anderson. "We

have plenty of weeds to control, with two of the worst ones being field bindweed and the Canadian thistle. We locate a plot where some noxious weed is present, fence or stake it off and then apply the weed killers at the proper time. When a farmer sees weeds growing in profusion everywhere except inside that one-rod plot, he is already half-convinced."

In establishing these plots, Mr. Anderson and other officials work closely with the county agricultural agents. The county agent has the confidence of the land owners, his opinion is unbiased and whatever he recommends will receive serious consideration.

The company likewise seeks and obtains the cooperation of the manufacturer. This is especially valuable, because the manufacturer will furnish his own experts and help a great deal on the advertising. He has attractive pictures and charts which may be used effectively.

"One of our main jobs is training the retail dealer in selling farm chemicals," Mr. Anderson explained. "We help them set up demonstrations. We visit with them, and try to keep them informed on new methods and products."

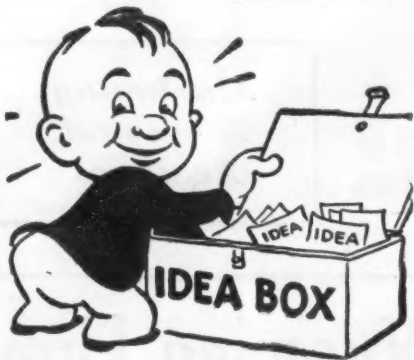
Most of the counties in which the Dakota Improved Seed Co. operates have published yearly chemical work sheets which are available to everyone interested in agriculture. This information covers almost everything, but especially stresses the kinds of weeds and insects and how to get rid of them.

Because they were selling farm chemicals along with planting seed, the firm became interested in controlling insects by seed treatment. This last year they mixed insecticides with the seed and found that insect damage was much less.

"This is still somewhat in the experimental stage," said Mr. Anderson. "But like other new trends, the wide-awake dealer will stay abreast of them. When we see a dealer interested in new products and is always asking questions, we know he will sell more than the dealer who is indifferent."

"This firm likes to work with these men and will put out much extra time and expense to train them. Such dealers may not have much business at the time, but they will create it. Their enthusiasm and new knowledge will rub off on the farmers, and a lot of new sales will be made."





## What's New...

In Products, Services, Literature

You will find it simple to obtain additional information about the new products, new services and new literature described in this department. Here's all you have to do: (1) Clip out the entire coupon and return address card in the lower outside corner of this page. (2) Circle the number of the item on which you desire more information. Fill in your name, your company's name and your address. (3) Fold the clip-out over double, with the return address portion on the outside. (4) Fasten the two edges together with a staple, cellophane tape or glue, whichever is handiest. (5) Drop in any mail box. That's all you do. We'll pay the postage. You can, of course, use your own envelope or paste the coupon on the back of a government postcard if you prefer.

### No. 6824—New Products Catalog

Publication of the latest edition of its products catalog describing properties and uses of 375 industrial, pharmaceutical and agricultural chemicals, is announced by the Dow Chemical Co. The 1958-59 issue is the fourth annual booklet issued by Dow. Containing a new cover and new features, the catalog is a ready reference for Dow's broad range of chemicals. This catalog may be obtained without cost by checking No. 6824 on the coupon and mailing it.

### No. 6836—Anionic Surfactant Booklet

Antara Chemicals Sales Division of General Aniline & Film Corp. has published a 16-page booklet on the properties and uses of its Igepon series of anionic surfactants. The brochure describes the chemical derivation of Igepon and gives the chemical formula, functional properties and uses of each of the brands. For copies, check No. 6836 on the coupon and mail to this publication.

### No. 6834—Gibberellin Publications

Two publications on gibberellin have been published by Merck & Co.,

Inc. One is a reprint of an article, "The Effects of Gibberellin on Economic Crops," by S. H. Wittwer and M. J. Bukovac of Michigan State University. The other is a booklet entitled "What You Can Tell Farmers About 'Bibrel.'" It contains information on the commercial use of gibberellin. For details, check No. 6834 on the coupon and mail to this publication.

### No. 6835—Instrument Data Sheet

Techniques for making pH measurements in soils, emulsions, suspensions and oils are covered in a data sheet issued by the applications laboratories of Beckman/Scientific and Process Instruments Division. Proper care of pH electrodes is discussed and step-by-step procedures are detailed for pH measurements in dry, porous samples, oils and other water insoluble liquids. For details, check No. 6835 on the coupon and mail to this publication.

### No. 7236—Bag Handle

The Multiwall department of Hudson Pulp & Paper Corp. announces a double side handle has been added to Multiwall bags. The handles support weights of 50 lb. and more, the



company says. With the new handles the bag can be carried like a suitcase. It also makes for easy pouring, the company added. For more information, check No. 7236 and mail to this publication.

### Also Available

The following items have appeared in the What's New section of recent issues of Croplife. They are reprinted to help keep retail dealers on the regional circulation plan informed of new industry products, literature and services.

### No. 6822—Fertilizer Formulation Pad

A new fertilizer formulation pad, suited as a guide for using "Uramon" ammonia liquors, has been issued by the DuPont Co., polychemicals department. The inside cover of the pad contains pertinent information on composition of fertilizer materials, ammoniation rates of phosphates, miscellaneous conversion, and water content of fertilizer materials. For information on how to receive pads, check No. 6822 and mail.

### No. 6821—Range Fertilization Report

Balfour, Guthrie & Co., Ltd., has prepared a folder entitled, "2nd Report to California Ranchers on Range Fertilization." The brochure states that "second and third year results show average yearly increase in profits of \$14.29 per acre." The folder will be sent if you will check No. 6821 on the coupon and mail it to this publication.

### No. 7118—Bagging Scale

Burrows Equipment Co. has announced a new bagging scale. Known as Model No. 700, the scale occupies



an area 18 in. square. It can be attached quickly to a feed mixer, bin or hopper, and it will bag at the rate of six to eight bags a minute and the bag clamp is designed to hold paper, burlap or cotton bags of 50 to 100 lb. capacity. The weigh beam is built into the back of the scale. For details, check No. 7118 on the coupon and mail it to Croplife.

### No. 6829—Cost Calculator

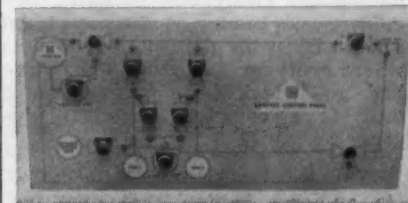
A pesticide and cost calculator has been introduced by the Pest-Cal Co. The company claims quick and accurate calculations for dosages of over 70 pesticides used in household, agricultural and weed control work. On one side of the circular chart insecticide formulations are divided into emulsifiable concentrates, wettable powders and solutions. When the calculator is rotated to the desired product, the dosage rate appears in a small window. On the reverse side a cost calculator figures finished spray cost. For information, check No. 6829 and mail.

### No. 7210—Exhibit Display

A lightweight 10 ft. exhibit display designed for easy assembly is now available from Federal Displays, Inc. The exhibit is packed in a shipping case 4 ft. by 8 ft. by 3 in. and weighs 110 lb. The unit can be assembled in 15 min. without tools, officials say. Check No. 7210 on the coupon and mail to this publication for more details.

### No. 6826—Graphic Control Panel

The Barnard & Léas Manufacturing Co., Inc., announces the addition of a graphic control panel as standard equipment on the B & L Auto-



batch and the B & L Autobatch Skid Plant line of liquid fertilizer equipment. The panel provides remote control and operation of various components together with visual indication of the sequence involved, the company says. The routing of finished products and raw materials to and from storage and load-out is by means of electrical controls. Check No. 6826 on the coupon and mail for more complete information.

Send me information on the items marked:

- |   |  |
|---|--|
| <input type="checkbox"/> No. 6821—Fertilization Report  | <input type="checkbox"/> No. 6832—Drum Phosphating Process   |
| <input type="checkbox"/> No. 6822—Formulation Pad       | <input type="checkbox"/> No. 6833—Fly Repellent              |
| <input type="checkbox"/> No. 6824—New Products Catalog  | <input type="checkbox"/> No. 6834—Gibberellin Publications   |
| <input type="checkbox"/> No. 6825—Truck Sprayer         | <input type="checkbox"/> No. 6835—Instrument Data Sheet      |
| <input type="checkbox"/> No. 6826—Graphic Control Panel | <input type="checkbox"/> No. 6836—Anionic Surfactant Booklet |
| <input type="checkbox"/> No. 6827—Available Reprints    | <input type="checkbox"/> No. 7118—Bagging Scale              |
| <input type="checkbox"/> No. 6828—Soil Gauges           | <input type="checkbox"/> No. 7210—Exhibit Display            |
| <input type="checkbox"/> No. 6829—Cost Calculator       | <input type="checkbox"/> No. 7213—Mobile Floor Crane         |
| <input type="checkbox"/> No. 6830—Trailer Spreader      | <input type="checkbox"/> No. 7236—Bag Handle                 |
| <input type="checkbox"/> No. 6831—Silica Insecticide    |  |

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## No. 6827—Available Reprints

Reprints of a large number of publications on all phases of fertilizer, soils and crops are available from the American Potash Institute, Inc. The institute says the reprints can be obtained in moderate quantities as long as its supply lasts. For a list of available reprints, check No. 6827 on the coupon and mail it to this publication.

## No. 6828—Soil Gauges

Two probes developed by Nuclear-Chicago Corp. permit rapid determination of moisture content and density on the surface level, the company says. The models P21 and P22 Surface Moisture and Surface Density Probes are the latest additions to the company's "d/M Gauge" system. The probes provide moisture and density measurements directly on the surface of the material eliminating the necessity of removing, weighing or destroying a sample of the material for testing, the company says.



Complete details can be obtained by checking No. 6828 on the coupon and mailing to this publication.

## No. 6830—Trailer Spreader

Simonsen Manufacturing Co. has added a tractor-drawn trailer spreader to its line of fertilizer spreaders. According to the company, the fertilizer dealer can start operations



earlier because he can get into the fields with a tractor where a truck spreader couldn't operate. The trailer spreader has an all-weather wheel-drive assembly and the unit's fan operates from the power take-off of any standard tractor. For details, check No. 6830 on the coupon and mail to this publication.

## No. 6833—Fly Repellent

Union Carbide Chemicals Co., Division of Union Carbide Corp., announces that Crag fly repellent has been cleared by the U.S. Department of Agriculture as an ingredient for livestock spray formulations on a "no residue" basis. According to the company, the product is effective against horse flies, stable flies, horn flies, mosquitoes, house flies and gnats. For information, check No. 6833 and mail.

## No. 6825—Truck Sprayer

The model 1,000 truck sprayer has been developed by Kaw Fertilizer Service, Inc. The pump kit allows the unit to be installed and operating in half a day, it is claimed. Features are: PTO-operated, 50 g.p.m. transfer, 33-ft. coverage, 1½-in. and stain-



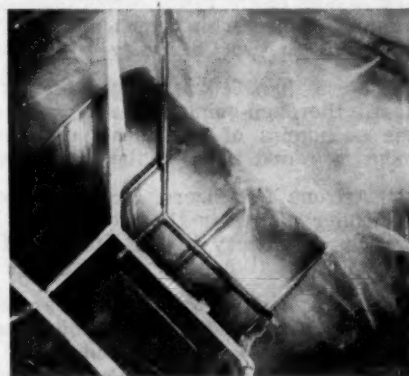
less steel filter. The tank and booms are on skids and can be removed from the truck. The tank has a capacity of 1,000 gal. and is of 12-gauge metal. Check No. 6825 on the coupon and mail it.

## No. 6831—Silica Insecticide

Davison Dri-Die Insecticide 67 is a new silica aerogel powder which is now on the market under an experimental label. Developed through research at University of California at Los Angeles, Dri-Die acts on insects in two ways: By dehydration and by a secondary chemical action. Insects need not eat the insecticide to be killed; simply crawling over the dust is sufficient. The Davison Chemical Division indicates there is no need for mixing, since the product is produced ready for treatment. Data on Dri-Die may be obtained by checking No. 6831 on the coupon and mailing.

## No. 6832—Drum Phosphating Process

Bennett Industries, Inc., announces a steel drum phosphating process in which 30 and 55-gal. drums pass through an eight-step procedure. In the washer, hundreds of high pres-



sure nozzles spray drums inside and out in each of six stages. In the final two steps, the drums are dried and the cooling is controlled so that they reach the paint spray equipment at the best temperature for paint application, the company says. According to the company, the film of phosphate coating received in the process provides a good surface and inhibits rust and corrosion. For details, check No. 6832 on the coupon and mail.

## No. 7213—Mobile Floor Crane

The Vanguard Engineering Co. announces the Aero-Crane, a counter-balanced mobile floor crane having an adjustable boom with the hook reaching 48 in. beyond the front



edge of the truck. The crane has a 10 ft. high reach and goes down to 1½ ft. from the floor. The running gear is of 10 in. diameter Timken bearing wheels for easy rolling, the company says. The unit is available in several models from 1,000 lb. to 3,000 lb. capacity. For more details check No. 7213 on the coupon and mail to this publication.



Unload fertilizer in the rain? Sure—if it's Spencer "Mr. N" Ammonium Nitrate in the new weather-proof bag. (See complete story below.)

New from Spencer Chemical Company . . .

## Fertilizer In An All-Plastic Bag That Farmers Can Re-Use!

Spencer "Mr. N" Ammonium Nitrate now comes in a plastic bag you can store right out in the open:

First to give you prilled fertilizer for easier application . . . first to give you polyethylene-lined bags to stop caking . . . Spencer Chemical Company now brings you the most important new development in fertilizer packaging since the switch to paper bags 18 years ago!

### Completely New Kind of Bag

The new Spencer "Mr. N" Ammonium Nitrate bag is made entirely of polyethylene plastic. This 50-pound bag keeps ammonium nitrate drier than any other bag made! In fact, polyethylene bags of Spencer "Mr. N" are so weathertight that even a drenching rain can't get inside.

### Makes Storage Easy

Storage space is never a problem with these new bags, because farmers can unload and temporarily store them right in the field. Dealers use porches and cribs for storing rain-proof bags of Spencer "Mr. N." Some even build a protective wall of plastic "Mr. N" bags on a covered porch and

store paper bags of fertilizer behind it!

### Re-Use After Empty

When the bags are empty, your customers will use them to store seed or small tools, cover windows, or insulate buildings. Or, they can heat-seal the bags together to form a giant sheet of polyethylene. Twenty-four plastic "Mr. N" bags heat-sealed together make a tractor cover. A ton of "Mr. N" provides enough bags to make a tarpaulin big enough to cover a haystack!

Thousands of farmers have expressed great interest in the new bags as shown at recent state fairs throughout the Midwest and South.

With each shipment of "Mr. N" in these new bags, Spencer will send you free announcement ad mats and copies of the folder, "How to Re-Use Plastic Fertilizer Bags." Also, your own announcements will be backed by big Spencer "Mr. N" ads in leading farm magazines.

### More Information Free

To see many of the ways farmers can re-use the plastic "Mr. N" bags, and to get a free sample of these remarkable bags, use the coupon below. Or, still better, be the first in your territory to offer "Mr. N" in these revolutionary new bags. Place your order now through your manufacturer's representative.

**Tear Off and Mail This Coupon Today! ↓**

Spencer Chemical Company  
536 Dwight Building  
Kansas City 5, Mo.

At no cost or obligation to me, please rush the items checked below:

☐ Sample polyethylene bag. ☐ Booklet, "How To Re-Use Plastic Fertilizer Bags."


Name .....

Address .....

City ..... State .....

Name of manufacturer from whom I buy fertilizer .....





## Fertilizer Recommendations For Georgia

Ratios	Grades
1-1-1	8-8-8
1-2-2	6-12-12
1-2-3	5-10-15
1-2-1	6-12-6
1-3-3	4-12-12
0-1-1	0-14-14
0-1-2	0-10-20
1-0-1	14-0-14

**For Flue-Cured Tobacco**  
 3-9-9, 3-9-13  
 6-3-24 for side dressing purposes only  
 4-9-3 for plant beds only

**FOR SPECIFIC RECOMMENDATIONS - HAVE YOUR SOIL TESTED**  
 For further information -- SEE YOUR COUNTY AGENT

AGRICULTURAL EXTENSION SERVICE  
 UNIVERSITY OF GEORGIA COLLEGE OF AGRICULTURE  
 ATHENS

COPIES of the above poster were distributed to members of the Georgia Plant Food Educational Society for use in helping farmers buy fertilizer. The posters were created by the University of Georgia's college of agriculture and the U.S. Department of Agriculture.

### SHOP TALK



## OVER THE COUNTER

By Emmet J. Hoffman  
 Croplife Marketing Editor

A store filled with "good to buy" merchandise—manned by friendly sales people—becomes an exciting side show when a good-sized crowd of shoppers is on hand.

The farm store manager who can engineer a continuous flow of traffic through his store day after day can nearly always show a worthwhile net margin.

Achieving steady store traffic is not a simple, easy job. There are some mighty big agricultural changes taking place that are working against heavy traffic. Here are just a few of these changes:

- In total, there are fewer farmers in most communities.

- Farmers that remain are becoming larger businessmen and are more discriminating buyers than they were several years ago.

- Farmers are growing accustomed to more services, such as having their supplies delivered and custom work. Many farmers order by phone.

- Many stores are located "on the track," instead of on the main street or in a convenient traffic center.

In spite of these changes, there are many farm store operators who consistently "walk on water," so to speak, and fill their stores with customers day after day.

There are keys that will open the door to an increased flow of traffic for your store. The manager should learn how to use these keys.

Key No. 1—Select, display and advertise seasonal items that people are buying right now. Don't try to sell farmers what you think they should buy. Sell what they want to buy.

Key No. 2—When customers first step in the door, say hello. No businessman ever went broke who said hello as though he meant it. The key: Be friendly all the way.

Key No. 3—Price the items to please both the user and yourself. Simply, this means:

- Price competitively (not high—not low).

- Post prices in plain sight.

- Show ways to save by buying (1) quantity, (2) for cash and (3) in bulk.

- Have a bargain a day. If you've got a 1935 broom, sell it for the price of the handle.

Key No. 4—Clean up! A clean, neat store is just like a spring in the desert. It's refreshing and stimulating and generally is outstanding. The cost is very low. It helps sell and keeps a store busy.

Key No. 5—Put on a show. There are many ways to do this. Once a store manager brought in a cow heavy with calf and offered \$5 to the customer who guessed the time closest to actual birth time. Farmers, city people and others stopped by. Some came at night to peek through the store front to "see how things were." There are scores of other ways to attract traffic—free coffee, guessing contests and Chinese auctions.

Key No. 6—Hold an open house once a year. Create bargains. Give door prizes. Feed 'em.

Key No. 7—Use the key to open the door, not to lock it. One of the secrets of running a store successfully in 1959 will be to have the doors open for customers to come inside. Study the community and adapt store hours to the needs of the customers.

## What's Been Happening?

This column, a review of news reported in Croplife in recent weeks, is designed to keep retail dealers on the regional circulation plan up to date on industry happenings.

A presentation on how farmers accept new ideas, a panel discussion of equipment, inventory control and standardization as pathways to profits and a look at the changing economic society as a challenge to today's business leadership were the program highlights at a lively annual meeting of the National Fertilizer Solutions Assn. held in Cincinnati.

A full three-day convention featuring representatives of the fertilizer industry, the universities and the entertainment industries comprised the 35th annual convention of the California Fertilizer Assn. in Los Angeles. Some 500 attended, with many coming from distant portions of the country.

Ray Hubble, Medford, Ore., was elected president at the seventh annual Oregon State Weed Conference in La Grande, Ore. More than 250 Oregon farmers, ranchers, weed control specialists and chemical company representatives from all over the U.S. discussed weed control problems and latest scientific developments.

The U.S. Department of Agriculture has announced changes in the barter program through which surplus Commodity Credit Corp.-owned farm products are exchanged for strategic and other materials produced abroad. The changes will be effective immediately with respect to new barter offers.

The city of Baltimore will allow fertilizer grade ammonium nitrate to move freely through its port. That's the gist of an ordinance compromise brought about at a special hearing there, Nov. 10.

United Heckathorn Co. of Richmond, Cal., is opening its first agricultural chemical manufacturing plant at Magna, near Salt Lake City, Utah.

The Tennessee Valley Authority said Nov. 12 that it has discontinued the manufacture of concentrated superphosphate containing 48% plant nutrient, and is engaged in perfecting a process for the manufacture of superphosphate of a higher concentration.

Although the U.S. Department of Agriculture says in its November Demand and Price Report that "some reduction in realized net income appears to be in prospect" for farmers in 1959, this report must be diagnosed by crops and areas, said John Cipperly, Croplife Washington correspondent.

A new method of incorporating calcium cyanamid into soil shows great promise of increasing the chemical's effectiveness in controlling annual weeds, according to two University of California scientists.

More than 300 representatives of the fertilizer manufacturing industry heard thorough-going discussions on production techniques, equipment and the economics of preventive maintenance during the three-day fertilizer industry round table at the Mayflower Hotel in Washington, D.C.

Arizona Fertilizers, Inc., Phoenix, completed construction of a \$50,000 emulsifier plant for the blending of liquid insecticides at its Yuma, Ariz., branch. Machinery in the 5,000 sq. ft. plant has a production capacity of about 1,000 gal. per hour and storage facilities for about 10,000 gal.

A description of the program conducted by the National Plant Food Institute in the Southeast, a talk on the merits of soil testing and a panel discussion on a soil fertility program carried on with farmers in two North Carolina counties comprised a large portion of the Southeastern Fertilizer Conference held at the Biltmore Hotel in Atlanta, Ga.

"There are no short-cuts, push-buttons or ready-to-wear solutions" to the problems of the agricultural chemical industry, Frank S. Washburn, general manager of the Agricultural Division, American Cyanamid Co., declared at the closing session of the 25th anniversary meeting of the National Agricultural Chemicals Assn. in Savannah, Ga.

An attempt by the Minnesota Farm Bureau Service Co., St. Paul, to express fertilizer ingredients in elemental terms rather than on an oxide basis is meeting with little reaction on the part of the firm's customers.

North Dakota Nitrogen, Inc., of Bismarck, N.D., announced it had awarded a contract to the Chemical & Industrial Corp., Cincinnati, as consulting and construction engineer for a fertilizer plant in the Bismarck area.

Members of the National Agricultural Chemicals Assn. took a long look at 25 years of growth and progress in the pesticide field during the group's silver anniversary convention here Oct. 29-31—then more than matched the story of the past 25 years with some searching looks into the next 25 years. About 600 attended.

A panel discussion on accident case histories; the value of safety training in plants; safe handling of ammonia and solutions; and a clinical examination of the accident-prone individual made up an important part of the two-day annual meeting of the Fertilizer Section, National Safety Council in Chicago, Oct. 20-21.

An intensive effort to eradicate witchweed, a parasitic plant that attacks corn and some other crops, is getting under way in North and South Carolina, the U.S. Department of Agriculture announced.

A total of 1.9 million short tons of marketable potassium salts were produced in the U.S. in the first half of 1958, the U.S. Bureau of Mines reported. This tonnage contained 1.1 million tons of K<sub>2</sub>O equivalent.

The Association of American Fertilizer Control Officials and the Association of American Pesticide Control Officials urged that defoliants, desiccants, plant regulators and nematocides should be brought within the scope of the Federal Insecticide, Fungicide and Rodenticide Act. The resolution was made at the two groups' annual meeting in Washington, Oct. 17 and 18.

The Association of American Fertilizer Control Officials, at its annual meeting, recommended that the taking of fertilizer samples be done at the individual fertilizer plants.

Hugo Riemer was named executive vice president of U.S. Borax and Chemical Corp., following a meeting of the board of directors in New York.



ST. LOUIS, DECEMBER 1, 1958 —

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Doing Business With

## Oscar & Pat



When plump Tillie Mason came to work that late fall day, she found Oscar busy as a beaver at his desk, and in a way which was quite unusual for him. Oscar usually worked on his discounts first, for he was never a man to miss one, even if it meant that Pat and he had to defer their weekly salary checks for a few days.

But this morning Oscar stood at his desk cutting up cardboard boxes with a long shears and working rather hurriedly and apparently with great zest.

"Why, Oscar, what are you doing?" Tillie asked as she hung up her new fur collared coat on a wooden hanger near her desk.

Oscar turned quickly. There was a gleam in his otherwise cold eyes. "Ach, I am doing a goot stroke of business!" he snapped. "I am going to gif that Irisher a lesson he will remember."

"Oh!" exclaimed Tillie. "It isn't going to be another one of those days, is it? I can't stand any more fights."

Oscar chuckled drily. "It will not be a fight. It will chust make that Irisher think about costs a little more. All he thinks of is sales."

Tillie shrugged and sat down at her typewriter. But she could not, being a woman, refrain from glancing curiously in Oscar's direction now and then as he clipped cardboard and chuckled almost fiendishly from time to time.

She noted that he had a number

of 15 in. cardboard squares. On these, she also saw that he was clipping excerpts of printed material from the current issue of Croplife. Then he would take a glue-pot and paste one of the excerpts on a piece of cardboard.

She saw Oscar stand back and survey a cardboard with a clipping on it. Then he took a black crayon from his desk, made a number of black marks around the clipping on the cardboard and surveyed it again.

"Ach!" he muttered. "That iss better."

He continued this task until he had about eight or nine cardboards prepared, each bearing a separate, printed excerpt from Croplife, and each clipping set off by wide black crayon marks.

"For Heaven's sake, Oscar," Tillie asked suddenly, no longer able to restrain herself. "What are you doing?"

Oscar gave an evil little chuckle. "Ach, I will fix him," he said. "All the time he laughs at me for pinching the pennies! Well, I am not like him, chasin' dollars and never catching them. Spendt! Spendt! Spendt! That's all he can think of."

As Tillie drew near, Oscar took the cardboards with the clippings glued to them. One by one he arranged these cardboards on Pat's desk, propping them up with agricultural year-books and other material on his partner's desk.

It was a motley array of signs. Only

a blind man could ignore them. Oscar surveyed them with a proud gleam in his eyes. "Ach, if that Irisher would be doink this, he would first order about \$10 worth of nice white cardboard from the office store. And maybe some new crayons. Ach, he would send up the expense. But not me. I use cardboardt from old paper boxes. I safe money for the firm."

"It must be terribly important for you to do all this work and neglect your discounts," Tillie offered, peering at the signs. "Aren't those clippings from Croplife?"

"You bet they are from Croplife!" Oscar crowed. "I like that man Glenn Welsch, that professor from Texas. He talks sense in his article 'Cost Control for Small Marketers.' Ach, I want Pat to be sure to read it."

"B—but, why all the signs? Why not just lay the article on his desk?"

Oscar snorted. "I have cut out and marked the items about holding down costs. I want that Irisher to see them. Then he will know I am right." He pointed at one sign.

"Read that," he ordered Tillie. "Welsch talks sense."

Tillie picked up the cardboard and read, "Although great attention is usually given to increasing sales volume, control of costs is often neglected. Yet cost control is one of the soundest methods of increasing profits. Increased volume is of no consequence if costs rise to the extent that they offset earnings."

Oscar glowed. "Ach, that's what I believe. Read this one." He thrust another cardboard sign into Tillie's hands.

"The first cost control pointer concerns your own attitude. Cost consciousness on your part will tend to impart a similar cost consciousness among your employees. Numerous surveys have shown that employees tend to view cost control in the same manner that the boss views it. Therefore, your attitude toward costs must be constructive and consistent."

"Yah," Oscar exploded. "That is why we don't make much money. That Pat. All he thinks about is sell, sell, sell, and spendt, spendt, spendt. He forgets to collect. He laughs at me when I take discounts. Ach, what do the employees think? They think they can sell to anybody, no matter if they got goot credit or not. They see Pat do it, and they think they can do it. Then we got lots of bills that ain't paid and we haf to borrow from the bank to pay salaries. Ach, such monkey business."

Tillie looked up. "Well, Oscar, if you feel that way about it, why don't you sell out to Pat and go buy a business of your own somewhere? Life isn't worth all this arguing and fighting."

"He can't buy me out!" Oscar wailed. "He ain't got a red cent. He owes everybody, he lives so high and so foolishly. Ach, and when I want to buy him out he won't sell. But I will findt a business someday. I read Croplife adts effery week. One of these days somebody will offer chust the business for sale that I want."

"Oh," said Tillie worriedly, "here comes Pat now. I'm going across the street for a soda. I don't want to be here when Pat blows up after he reads those signs on the cardboards. Want to come along, Oscar?"

Oscar's ramrod back got even stiffer. "Ach, I will not," he said firmly. "I will sit at my desk figuring discounts chust like I always do. Und when he schnapps at me about those signs I put on his desk, I will schnapp right back at him. Ach, I haf not felt so goot for a long time. It must be those bratwursts Minnie made for breakfast."

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### FARM SERVICE DATA

Extension Station Reports

Most farmers want to get every dollar possible from each one spent on fertilizer. This was the idea farmers in Hoke County, North Carolina, had when they conducted a county-wide soil testing program for the 1958 season with the assistance of fertilizer dealers.

For several years net farm income had gone down for Hoke County farmers. This downward trend was largely a result of cuts in cotton and tobacco allotments. But, it was apparent to W. C. Williford, county agent, and other agriculture workers that income of the farmers would be improved if they could increase their production of all crops per acre with better fertilization. And the best tool for improving fertilization practices is a good soil test. Thus, it seemed that a program to get every Hoke County farmer to take at least one soil sample would be the first step towards a more prosperous Hoke County. The program was called the "Big Test."

This story was easy to put across. This is because farmers are realizing more today than ever before that returns from investments in fertilizer and lime are greatest when they are applied on the basis of soil and crop requirements. Modern soil testing procedures and soil fertility research offer the best answers to this problem.

But it is easy for a farmer to put

off taking soil samples until it is too late to get recommendations before planting a crop. The "spark" used to get farmers from putting this job off was a plan for communities to compete with each other in seeing which one could get all farmers taking at least one soil sample by a deadline.

Fertilizer dealers played a key role by passing soil sample boxes and information sheets to farmers. Later, they collected the samples for a one-truck-load-trip to Raleigh. This saved a large postal bill.

While competition between communities aroused interest among farmers on soil testing, Mr. Williford and soils specialists from North Carolina State College and the soil testing division of the North Carolina Department of Agriculture were explaining how to take good samples. Soil sampling demonstrations and meetings were held in each community. In this educational program every farmer could learn how to take a good soil sample—the first step in getting good results from a soil test.

Results show that the program paid off. There were 4 of the 7 communities which got every farmer to participate. The Antioch community was the first one to pass the "Big Test." There were nearly 4,000 soil samples collected as a result of the program.

Realizing that farmers would talk



over their fertilizer needs with their fertilizer dealer, Mr. Williford had special training meetings for the dealers. In these meetings soils specialists from the soil testing division and North Carolina State College explained how to interpret the soil test results and how the recommendations are based on results of research.

This was important training for the dealers. They reported that about three-fourths of the farmers brought their soil test recommendations along when buying fertilizer. Farmers often had questions about various parts of the recommendations—such as why in one case for cotton, nitrogen side-dressing was recommended and in another, both nitrogen and potash.

Results of crop yields are not available yet. Nevertheless, there are many Hoke County farmers happy with the results of following recommendations based on soil tests. They are already pushing soil testing as a way of producing more profitable small grain this fall.

As for fertilizer sales, they went up. Preliminary figures show an increase of 14.7% over the previous year in total tonnage of mixed goods. Fertilizer sales for the whole state of North Carolina went down about 4%. High-potash fertilizers increased more than others. For example, in 1956-57 6-6-12 made up only 3.5% of the sales; this year it made up 15.9%.

The significance of these facts in regard to the soils program in Hoke is even greater when crop acreage is considered. There was over twice as much cotton in the soil bank in 1958 as in 1957, and almost twice as much tobacco.

All these facts show that Hoke County farmers were better off in 1958 because of the "Big Test."

★

Late blight poses a serious threat to potato growers in Florida. Dr. A. H. Eddins, plant pathologist in charge of the Potato Investigations Laboratory, Hastings, gives the following directions for making a nabam-zinc sulfate spray to control late blight.

1. Start running water in tank with agitator going.
2. Keep agitator going while spray is being mixed.
3. Pour in two qt. nabam for each 100 gal. water, after agitator is covered with water. Allow at least 1 min. for the nabam to mix with the water.
4. Slowly pour  $\frac{1}{4}$  to 1 lb. of finely granulated or completely dissolved zinc sulfate (36% metallic zinc equivalent) for each 100 gal. Allow at least 2 min. for the zinc sulfate to react with the nabam.
5. Add one quart 25% DDT emulsion for each 100 gal. of spray for aphid control. If DDT emulsion is not giving satisfactory control of aphids use parathion, 1 pt. 25% emulsion or equivalent per 100 gal. spray. No spreader-sticker is needed when the spray is used on potatoes.

6. Keep agitator going in sprayer and auxiliary tanks until the spray is applied.

Zineb 65% (two pounds per 100 gal.) and Manzate 70% (one and one-half lb. per 100 gal.) are recommended also.

The number and frequency of spray applications to control late blight vary according to when it appears and how severe it is. Late blight is more prevalent in a wet growing season, according to Dr. Eddins. Make the first application when the plants are six to eight in. tall, or sooner if the disease appears earlier. During dry seasons spray the plants at least five times at 5- to 10-day intervals to prevent damage from late blight and also to combat early blight. During wet seasons, when plants are attacked soon after they emerge and weather conditions favor blight development until harvest, Dr. Eddins says it may be necessary to spray the plants 10 times or more at 4- to 7-day intervals.

## FIELD SPREADING

(Continued from page 9)

ing the product and being able to advise farmers on what materials to use is essential in selling any kind of farm chemicals. Many of these sales are tied in with fertilizer sales.

The firm does not yet do custom application of insecticides and herbicides. Farmers usually do their own work on the small fields and around turn rows. Where the fields are large, most of the spraying and dusting is done by aerial contractors.

The company does a liberal amount of advertising, but they also try to keep in personal contact with as many farmers as possible. Mr. Deneis spends much of his time in the field, lining up future work and stopping to visit with farmers. Know-

ing as many people as possible is essential in this business, he says. Farmers don't always come to a certain store when they start buying fertilizer and insecticides. So the dealer who gets to them first and has a service to offer along with the materials will often get a farmer's business.

### TRADE SHOW CHAIRMAN

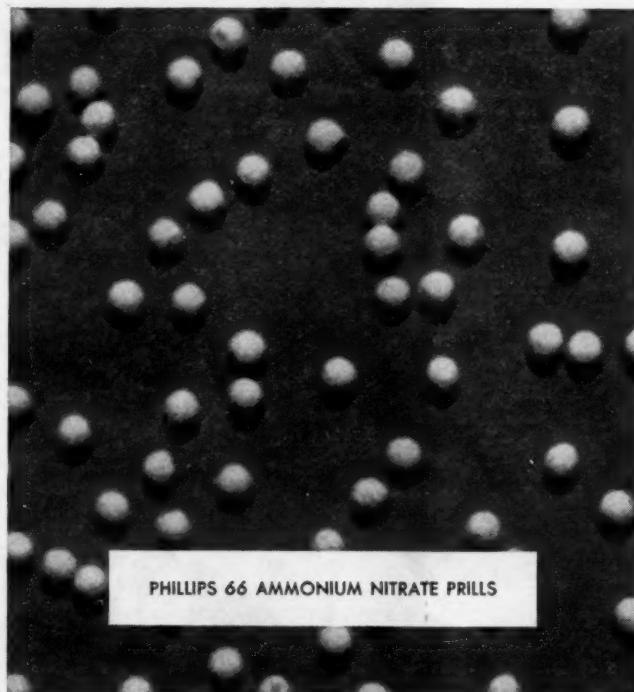
PORTLAND, ORE.—Dan Hogan, Jr., Portland, of California Spray-Chemical Corp., has been appointed chairman of the 1959 Pacific Northwest Garden Supply Trade Show, announced Harold Davis, president, Oregon Feed and Seed Dealers Assn., sponsor of the event. Mr. Hogan, a member of the trade show committee for the past several years, succeeds Frank Stewart, Miller Products, Portland, general chairman for the 1957 and 1958 shows. Remainder of the 1959 show committee will be appointed in the immediate future.

## \$1,000 Research Grant To University of Delaware

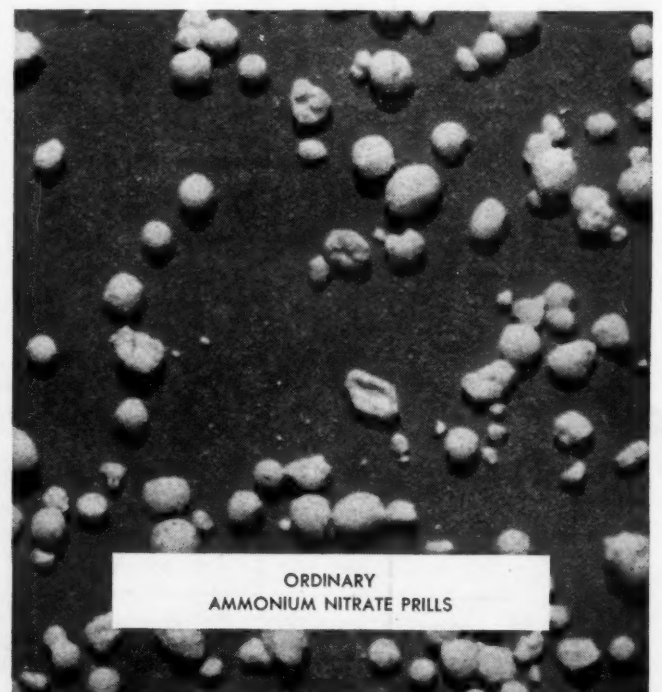
NEWARK, DEL.—The University of Delaware's department of entomology has received a grant of \$1,000 from the Atlantic States Tree Expert Co., Wilmington, for use in supplementing the department's research studies for the control of Dutch Elm disease.

Dr. Dale F. Bray, chairman of the department of entomology, will direct the work which will be carried out by James Touhey, Yorklyn, Del., a graduate student who is working toward an advanced degree in entomology.

The funds will be used to support Mr. Touhey's laboratory and field work in search of a chemical that will repel the bark beetle which transmits Dutch Elm disease fungus from one tree to another.



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DES MOINES, IOWA—6th Fl., Hubbell Bldg.

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MINNEAPOLIS, MINN.—215 So. 11th St.  
NEW YORK, N.Y.—80 Broadway  
OMAHA, NEB.—3212 Dodge St.  
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TAMPA, FLA.—3737 Neptune St.  
TULSA, OKLA.—1708 Utica Square  
WICHITA, KAN.—501 KFH Building



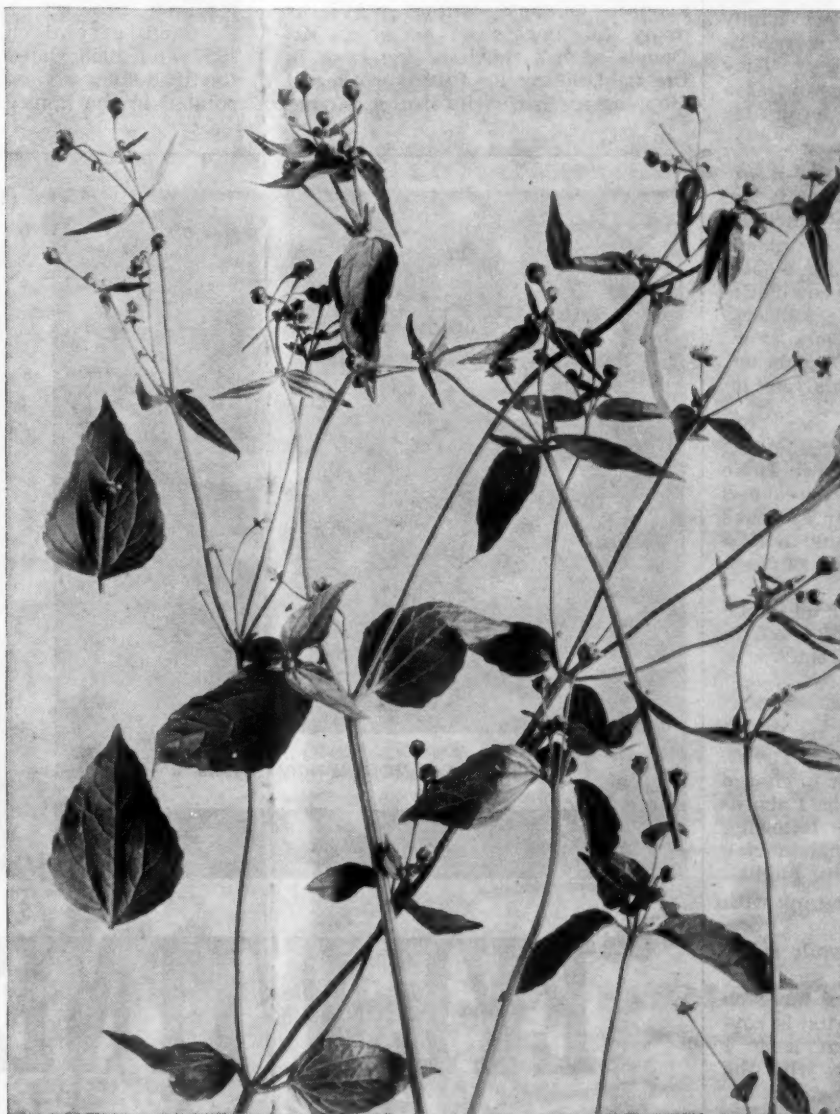


# WEED OF THE WEEK

Mr. Dealer—Cut out this page for your bulletin board

## Galinsoga

(*Galinsoga parviflora*)



### How to Identify

Galinsoga is a leafy plant, growing from one foot to about three feet in height. The leaves are opposite, sparsely rough-hairy, oval to lance-shaped, pointed at the tip, thin, and from 1 to 2 inches long. A native of tropical America, the plant has become naturalized and occurs in door-yards, waste places, and lowland fields, especially in damp areas with rich soil. In California, and other places where irrigation ditches are found, the plant grows along ditch banks.

### Characteristics of Galinsoga

The plant is an annual, reproducing by

seeds and rooting stems. Its flower heads are small, numerous, and scattered at the ends of branches. Ray flowers are very small, white, and four or five in number, surrounding the small yellow disk flowers. The plant flowers in July-September, and seeds during the same period.

### Damage Done by Galinsoga

Actually, the plant is more pestiferous than damaging. Occurring as it does in gardens, yards and in shrubbery, it is not one of the most serious of unwanted plant life.

Illustration of Galinsoga furnished through courtesy of the U.S. Department of Agriculture.



## USDA REPORT

(Continued from page 1)

200 tons. Although the largest tonnage consumed in both years was in this region, the increase in consumption in the West North Central region from 2,000 tons in 1952-53 to 42,600 tons in 1953-54 was the greatest change. The national consumption was estimated to have been 149,100 tons.

Compton (4) estimated that about 10,000 tons of fertilizer-pesticide products were sold in the 10 midwestern corn belt states in the calendar year 1953 and more than 75,000 tons in 1954. His estimate for 1954 for the continental U.S. was over 150,000 tons.

Shepard (9) reported that the total quantity of such products reached 200,000 tons in 1955.

Fertilizers containing pesticides were registered in 1952-53 with the control officials of 23 states and Puerto Rico (6) and in 1953-54 in 41 states (7). Berry (1) indicated that in 1954 sales of these products were made in at least 39 states, Hawaii and Puerto Rico. Similar surveys in 1955 (2) and 1956 (3) indicated sales in at least 42 of these areas.

Only a few states have published information on the quantities of fertilizer-pesticide products consumed therein. In addition to those shown in Table 1, Georgia reported 1,189 tons and 1,608 tons in the calendar years 1954 and 1955, respectively.

## Consumption in 1955-56

Shipments of fertilizer-pesticide products in 1955-56 totaled 120,868 tons, comprising 109,956 tons of mixed fertilizers and 10,912 tons of fertilizer materials (Table 2). Consumption of the respective classes represented 74% of all mixed fertilizers and .15% of all materials consumed in the U.S. in 1955-56.

## The consumption of these products, shown diagrammatically in

Table 2. - Fertilizer-pesticide products consumed, year ended June 30, 1956, by State and region

State and region	Consumption			Percent of total
	Mixed fertilizers	Materials	Total	
	tons	tons	tons	percent
Maine	368	0	368	0.30
New Hampshire	10	0	10	.01
Vermont	5	0	5	.00
Massachusetts	139	11	150	.13
Rhode Island	77	42	119	.10
Connecticut	152	82	234	.19
New England	708	133	841	.69
New York	116	477	593	.49
New Jersey	109	175	284	.24
Pennsylvania	306	44	350	.29
Delaware	27	0	27	.02
District of Columbia	1	0	1	.00
Maryland	977	0	977	.80
West Virginia	2	0	2	.00
Middle Atlantic	1,752	696	2,448	2.02
Virginia	4,615	32	4,647	3.85
North Carolina	2,425	0	2,425	2.00
South Carolina	14,415	9	14,424	11.94
Georgia	3,217	1	3,218	2.66
Florida	22,381	3	22,384	18.57
South Atlantic	46,223	46	46,269	38.52
Ohio	2,453	10	2,463	2.04
Indiana	2,087	188	2,275	1.83
Illinois	7,270	288	7,558	6.28
Michigan	438	538	976	.80
Wisconsin	2,917	0	2,917	2.42
East North Central	15,161	380	15,541	12.86
Minnesota	1,055	9	1,064	.88
Iowa	21,081	1,059	22,140	18.18
Missouri	3,410	30	3,440	2.85
North Dakota	805	312	1,117	.93
South Dakota	60	50	110	.09
Nebraska	2,811	930	3,741	3.10
Kansas	736	371	1,107	.92
West North Central	30,436	1,039	31,475	26.12
Kentucky	1,309	29	1,338	1.11
Tennessee	2,049	39	2,088	1.72
Alabama	2,411	0	2,411	2.00
Mississippi	0	0	0	0.00
East South Central	1,789	64	1,853	1.53
Arkansas	161	0	161	.13
Louisiana	541	0	541	.45
Oklahoma	744	65	809	.67
Texas	3	0	3	.00
West South Central	1,442	65	1,507	1.25
Montana	81	0	81	.07
Idaho	550	976	1,526	1.26
Wyoming	8	0	8	.01
Colorado	136	65	201	.17
New Mexico	0	138	138	.11
Arizona	0	0	0	0.00
Utah	42	375	417	.35
Nevada	8	3	11	.01
Mountain	771	1,550	2,321	1.92
Washington	1,135	1,153	2,288	1.90
Oregon	349	1,150	1,499	1.24
California	1,072	1,455	2,527	2.10
Pacific	1,126	3,045	4,171	3.46
Continental U. S.	106,508	9,087	115,595	96.00
Hawaii	0	0	0	0.00
Puerto Rico	1,750	1,085	2,835	2.36
Total	109,956	10,912	120,868	100.00

Figure 1, ranged from 843 tons in the New England region to 47,039 tons in the South Atlantic region. The tonnage consumed in the South Atlantic, West North Central (33,475 tons), and East North Central (15,541 tons) regions accounted for 79.47% of the national consumption. Mixed fertilizer-pesticide products supplied far more than 50% of the tonnage in Puerto Rico and in each region east of the Mountain States.

Among the individual states, the highest consumption was in Iowa (23,180 tons) followed by Florida (22,325 tons), South Carolina (14,424 tons), and Illinois (7,512 tons). In these four states, 55.8% of the national total was consumed. In most states, the tonnage of fertilizer-pesticide products represented less than 1% of the total consumption of mixed fertilizers and materials, respectively. The notable exceptions were in Nebraska, Idaho, and Iowa where 13.7%, 10.3% and 7.2%, respectively, of all mixed fertilizers contained pesticides.

## Mixed Fertilizers

In the continental U.S., 24 grades of mixed fertilizers containing pesticides were consumed in amounts of 1,000 tons or more (Table 3). These totaled 69,827 tons or 65.73% of the mixed fertilizer-pesticide products. Other grades numbered 134 and amounted to 22,102 tons (20.82%). The balance (14,279 tons, 13.45%) was not reported by grade. In addition, 24 grades (3,748 tons) were consumed in Puerto Rico. Only two of these were duplicated on the continent. Approximately 11% of the total number of grades of mixed fertilizers consumed on the continent and 60% of those consumed in Puerto Rico contained pesticides. The grades listed in Table 3 are among the principal grades of all mixed fertilizers used on the continent.

The 158 grades consumed on the continent consisted of 117 (74.05%) containing all three primary nutrients (N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O), 17 (10.76%) containing N and P<sub>2</sub>O<sub>5</sub>, one (0.63%) containing N and K<sub>2</sub>O, and 23 (14.56%) containing P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O. The 24 grades consumed in Puerto Rico comprised 22 (91.67%) containing all three primary nutrients and 2 (8.33%) containing only N and K<sub>2</sub>O. While the tonnage of N-P-K fertilizers consumed on the continent was 10-fold that of the N-P grades, a significantly higher portion (4.12%) of the N-P fertilizers contained pesticides than did the N-P-K grades (0.64%). The N-P products were mostly used in the North Central regions.

The total plant nutrient content of mixed fertilizer-pesticide products consumed on the continent ranged from 10% to 64% with a weighted average of 30.23%. The average was above that (28.65%) of all mixed fertilizers consumed on the continent in 1955-56. Nine percent of the tonnage of the fertilizer-pesticide products was supplied by grades containing less than 20% of nutrients, as compared with 39% and 52% for grades respectively containing 20% to 29% and 30% or more of nutrients.

Ten grades usually supplied 60% or more of the total tonnage of mixed fertilizer-pesticide products consumed in the region. These 10 were generally among the 15 largest tonnage grades of all mixed fertilizers used in the region. Table 4 shows the 10 grades consumed in the three regions (South Atlantic, East North Central, West North Central) of largest consumption. The amounts consumed are grouped by grade and pesticide used.

## Materials

The use of materials (Table 5) as carriers of pesticides was much less than that of mixed fertilizers. It was also relatively small when compared to the total use of this class of fertilizers. The areas of consumption with pesticides were directly related to the areas of importance in their normal

use as a fertilizer product. Approximately one-half of the total was consumed in the Mountain and Pacific regions, where use of this class of fertilizer is generally higher than that of mixed fertilizers. Over one-half of the balance was consumed in the West North Central region and the remainder was distributed throughout.

(Turn to USDA REPORT, page 20)

Table 3. - Principal grades of mixed fertilizer-pesticide products consumed in the continental United States, year ended June 30, 1956

Grade <sup>1/</sup>	Consumption tons	Percent of	
		Total percent	All consumption of grade percent
0-10-20	2,086	1.96	3.33
2-12-12	2,067	1.95	.52
3-9-9	3,085	2.91	.64
3-12-12	2,847	2.68	.24
4-7-5	2,712	2.56	2.35
4-8-4	1,491	1.40	13.18
4-8-8	1,927	1.81	.88
4-10-6	2,061	1.94	.56
4-12-12	2,268	2.14	.31
4-16-16	3,862	3.63	.63
5-10-5	6,431	6.06	.95
5-10-10	5,160	4.86	.40
5-20-10	6,953	6.55	11.90
5-20-20	10,289	9.68	1.47
5-40-0	2,029	1.91	34.01
6-8-8	1,050	.99	.39
6-10-4	1,069	1.00	1.37
6-12-12	1,347	1.27	.40
8-32-0	2,038	1.92	3.38
10-10-10	2,560	2.41	.39
10-20-0	1,450	1.36	2.27
10-20-10	1,121	1.06	.92
12-12-12	2,686	2.52	.56
15-15-0	1,238	1.16	3.93
24 Listed grades	69,827	65.73	.77
Other grades reported <sup>2/</sup>	22,102	20.82	.53
Not reported by grade	14,279	13.45	--
Total	3/ 106,208	100.00	.73

<sup>1/</sup> Grades consumed in amounts of 1,000 tons or more. <sup>2/</sup> 134 grades. <sup>3/</sup> In addition, 24 grades totaling 3,748 tons were consumed in Puerto Rico.

Table 4. - Mixed fertilizer-pesticide products consumed in largest tonnage, in selected regions, and consumption in class of pesticide, year ended June 30, 1956, by grades, in tons

Grade	Consumption with				Total consumption <sup>1/</sup>
	Aldrin	Chlordane	Dieldrin	Heptachlor	
South Atlantic					
5-10-5	16	4,772	978	0	6,879
5-10-10	93	3,803	462	0	4,820
3-9-9	321	2,708	0	3	3,085
4-7-5	117	2,595	0	0	2,712
0-10-20	2,064	12	0	10	2,086
2-12-12	2,044	23	0	0	2,067
4-10-6	128	1,933	0	0	2,061
4-12-12	356	1,189	0	78	1,732
4-8-8	178	1,495	2	0	1,679
4-8-4	0	1,491	0	0	1,491
Other (55) <sup>2/</sup>	4,898	14,091	43	824	19,866
East North Central					
4-16-16	3,144	1	0	213	3,358
5-20-20	2,385	0	0	145	2,530
5-40-0	1,424	0	0	183	1,607
3-12-12	1,244	0	0	0	1,244
10-10-10	1,146	0	0	42	1,188
12-12-12	337	0	0	62	399
8-16-16	381	5	0	0	386
3-9-27	352	0	0	16	368
6-24-24	365	0	0	0	365
8-32-0	286	0	0	42	328
Other (29) <sup>2/</sup>	2,417	1	0	242	3,388
West North Central					
5-20-20	6,614	0	0	965	7,579
5-20-10	5,871	0	0	735	6,606
12-12-12	2,121	0	0	143	2,264
8-32-0	1,558	0	0	141	1,699
10-20-0	1,283	0	0	105	1,388
10-10-10	1,191	0	0	50	1,241
15-15-0	1,195	0	0	41	1,236
10-20-10	870	0	0	29	899
3-12-12	666	0	0	42	708
6-24-12	601	0	0	83	684
Other (58) <sup>2/</sup>	5,367	6	0	538	6,132

<sup>1/</sup> Includes quantities containing other pesticides. <sup>2/</sup> All other reported grades (number in parenthesis) and quantities not reported by grades.

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## NEW CHEMICALS

(Continued from page 1)

Food Protection Committee was formed as a central clearing house of food additive information, to assist integration of research, promote research and provide accurate scientific information in this field to the public.

"Growth regulators should have as profound an effect on feeding the growing world population during the next 50 years as the use of commercial fertilizers and the advent of scientific hybridization has during the last 50," stated Dr. R. H. Wellman in his discussion.

The growth regulators have received increased attention since the discovery of naturally occurring auxins, indole acetic acid, Dr. Wellman said. The first commercial uses resulted from development of rooting hormones such as naphthalene acetic and indole butyric acids, and from the breaking of dormancy of potatoes with Ethylene chlorohydrin.

The scope of these regulants has been violently increased by the advent of gibberellin. A recent review by Wittwer & Bukovac in "Economic Botany" cites ten references of work prior to the arousal of interest in the U.S. in 1956 and includes more than 190 papers from 1956 to date, Dr. Wellman said. Economic uses of gibberellin are numerous and include such applications as uniform flowering of coffee trees; larger clusters and increased size of Thompson seedless grapes; thinner rind and better color of naval oranges; larger, better bleached celery, and more rapid growth of pasture grasses at lower temperatures.

More intense research in hormones has followed the development of gibberellin, the speaker indicated. Rohm & Haas reports a new regulator, sodium  $\alpha$ ,  $\beta$ -dichloroisobutyrate which has the unique property, at proper concentrations, of killing only pollen. Two new dwarfing agents are Amol-1618 and indole methane sulfonic acid.

In the defoliant field, DEF has shown amazing effectiveness at rates of one or two pounds per acre, Dr. Wellman added.

Twenty years ago herbicides were confined to arsenicals, borates and chlorates, Dr. Barrons said, and then came several synthetic organics and 2,4-D. As to the new materials, England has found commercial use of 2-(2,4-dichlorophenoxy) butyric acid and 4-(2-methyl-4-chlorophenoxy) butyric acid for selective weed control in certain crops.

Other new developments include (1) chlorobenzoic acids for deep-rooted perennials, (2) 2,2-dichloropropionic acid (Dalapon), (3) alpha-chloro-N, N-diallylacetamide has been approved for expanded lists of products, (4) 3-amino-1,2,4 triazole for Canadian thistle and poison ivy.

Development of new products requiring proof of no residue or the establishment of a tolerance takes lots of capital, Dr. Barrons declared. In predicting the future of a given product, one must recognize he is competing with tillage, with older and less effective herbicides and even with apathy.

In his discussion of fungicides, Dr. Swisher indicated the industry has come a long way from the first widely used materials—Bordeaux mixture and sulfur. The first major advance came about 20 years ago with the dithiocarbamates. This was followed by ethylene bisdithiocarbamates, nabam and zineb. As Dithane and Parzate these products have largely replaced copper sulphate and are now the most widely used fungicides. Another new development was of captan as a fruit fungicide.

Marketing procedures vary between insecticides and fungicides. No fungicides at present are marketed as technical materials for formulation, the speaker said.

Several new fungicides were mentioned by Dr. Swisher: (1) Dyrene used against Stemphylium on tomatoes, early blight on potatoes and tomatoes and celery blight, (2) Maneb against early and late blight of potatoes and tomatoes, celery blight and other vegetable diseases, (3) Cyrex which is in the developmental stage as a control of apple scab, (4) Thioneb, also in the experimental stage, for use on fruits and vegetables, (5) Karathane which has some protective properties plus some eradicating properties when applied as a foliar spray.

In the area of soil fungicides are PCNB or Terrachlor for cotton, peanuts, crucifers, vegetables and ornamentals and Bayer 22555, which has special merit as a seed treatment chemical on sugar beets, peas and beans yet is also effective as a soil fungicide, the speaker said.

Antibiotics have been found effective for control of certain bacterial and even some fungal diseases. They are of special interest, Dr. Swisher added, because they point the way to one of the future goals in disease control—control of bacterial and virus diseases.

Organic phosphates comprise a majority of the insecticides on the market, Dr. Ferguson said in his summary of new developments in this field. For the cotton boll weevil these include Guthion, malathion and methyl parathion and particularly the latter during the season just ended, he said. Systemic insecticides such as Thimet have gained attention because of the effectiveness of seed treatment. Two organic phosphates, Trolene and Cor-ral, have recently been introduced as animal systemics. Because of a resistance to chlordane by the German cockroach, Diazinon, Dicapthon and Korland have come into the picture.

In the horticultural field reported resistance to DDT by the codling moth has resulted in considerable work with Diazinon, Guthion and Trithion for control of the codling moth and other fruit pests on apples, the speaker continued.

Due to the tolerance limitations now prevailing, the need for an insecticide available for use close to harvest has caused renewed interest in TEPP and has introduced Phosphrin. Other new phosphates going through field evaluation now are DDVP, Delnav, Ethion and several European materials such as Phen-capton, Meta-Systox, Disystone and Ammidone.

Such toxicological problems as potentiation and chronic toxicity involved in certain new procedures established for clearing new compounds under the Miller Bill have been of



**NEW UREA FACILITY**—This all-aluminum prilling tower will produce solid urea at Spencer Chemical Co.'s Henderson, Ky., Works. The tower is the final unit of a 100-ton-per-day urea plant which has been under construction for the past year. Currently, the urea synthesis section of the new plant is "on stream" producing solutions for mixed fertilizer and direct application, the company says. The prilling towers will be put into operation sometime during the latter part of December. In addition to the standard 80-lb. paper bags, the new Spencer product will be available in 50-lb. polyethylene bags (inset) introduced by the company earlier.

major concern in new product development, Dr. Ferguson declared. Methods and techniques are being simplified and are being accepted as a means for providing information on tolerances.

Dr. Hare's discussion centered on antibiotics, both as growth stimulants and for disease control, and tranquilizers as additives to livestock and poultry feed. A speech on animal health products scheduled to be given by Dr. Robert W. Wolfgang, Hess & Clark, Inc., was cancelled due to illness of the speaker.

**Seven top agricultural scientists discussed research progress relating to new chemicals for agriculture at the Nov. 21 sessions.**

Speaking before some 300 leaders of the country's chemicals industries, each of the USDA's Agricultural Research Service scientists presented the latest developments in his field, reporting on progress that has been made on new and unique chemical compounds useful in today's agricultural practice.

A review of current efforts with plant regulators and some of the major problems of producing these chemical compounds was discussed by Dr. John W. Mitchell, plant physiologist head, Growth Regulator and Antibiotic Laboratory. Dr. Mitchell also described the effects of antibiotics as they are used to alleviate diseases of plants.

Progress in the development of nematocides was covered by A. L. Taylor, nematologist head, Nematology Section. Defining nematocides as chemicals used for killing the very small worms in the soil that feed on the roots of growing crop plants to the detriment of good healthy growth, Mr. Taylor said, "Nematodes . . . will be found in every acre of all the agricultural land in the U.S. and in the rest of the world as well."

In discussing the cost of treatment for this pest, Mr. Taylor declared that there is economic justification for using field nematocides

where the cost of the compound and its application is not more than 5% of the average selling price of the crop per acre.

Dr. A. M. Lee, veterinarian head, Animal Diseases and Parasite Research Division, then spoke on the latest developments and applied uses of animal tranquilizing compounds. He was followed by S. A. Hall, chemist-director, Pesticide Chemicals Research Laboratories, who presented remarks covering the broad field of insect attractants and repellents.

Immediately preceding lunch, Ezra Taft Benson, secretary of agriculture, addressed the entire group. The secretary discussed the importance of research in today's agricultural economy and commented upon the keen interest shown by the chemical industry in improving agricultural practices through the use of pesticide chemicals to aid in increasing production of food and fiber crops.

A tour of the Agricultural Research Center was scheduled immediately after lunch.

The first speaker on the afternoon program was C. S. Slater, soil scientist, Soil and Water Conservation, Research Division, whose topic was "Soil Conditioners." He discussed the effects of these chemical compounds on the soil and on below ground and above ground plant growth.

Mr. Slater listed a number of reasons why soil conditioners had not lived up to some of the exaggerated claims made for them by misinformed persons and then indicated some of the ways in which these materials can be useful in modifying soils for specific purposes, one example being treatments to make farm ponds leak proof.

New uses for old and new herbicides were then discussed in detail by Dr. W. C. Shaw, plant physiologist head, Weed Control in Crops Section, followed by a talk covering feed additives in poultry nutrition by Charles A. Denton, chemist and acting head, Nutrition Section, Animal Husbandry Research Division.

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## Monsanto Announces New Type Ammonium Nitrate Fertilizer

ST. LOUIS, MO.—Monsanto Chemical Co. has announced a new type of ammonium nitrate fertilizer which it says is dust free and will not cake during storage.

James E. Crawford, Jr., director of marketing for the division, said that the new product, "Lion E-2," offers advantages for both the dealer and farmer. "It can be stored indefinitely," Mr. Crawford said. "It can be stacked high without bottom bags caking, and its higher density takes 20% less space in storage and in farm machinery."

The new product is said to remain free-flowing even under unfavorable conditions. In addition, the product has the highest density of any prilled ammonium nitrate fertilizer now on the market, the makers state.

Monsanto reports that bags of the material have been stored for months in bonded warehouses in four sections of the country under a variety of adverse conditions. When the bags were opened, the company reports, the fertilizer was dust free and free-flowing.

Monsanto says its new product remains free-flowing because the intrinsic cause of caking has been eliminated by a processing technique. Experiments in Monsanto's mixed fertilizer pilot plant indicate that the new product, when used in the manufacture of mixed fertilizers of a high nitrogen to  $P_2O_5$  ratio, imparts its prill hardness and non-caking characteristics to the final product.

Monsanto is now manufacturing the new E-2 fertilizer, patents on which have been applied for, at its Luling, La., and El Dorado, Ark., nitrogen plants. It is available in both polyethylene and polyethylene-lined multiwall paper bags.

## Minnesota Short Course Planned

ST. PAUL, MINN.—New ideas in fertilizing and how they can boost farm income and how farmers can finance fertilizer investments are topics for the annual soils and fertilizer short course set for Dec. 8 at the University of Minnesota. Some 800-900 persons are expected to attend, according to J. O. Christianson, director of agricultural short courses. Program chairman is Curtis Overdahl, extension soils specialist.

Featured speaker will be J. B. Peterson, head of the agronomy department at Purdue University, who will discuss "A Look at Soil Conservation and Soil Fertility." Other speakers already scheduled will be from the University of Minnesota and the fertilizer industry. One general topic will be "Yield Potentials in Minnesota." Three speakers will outline possible yield goals, how farmers can use these goals and how they can pay off.

A Minnesota banker will discuss credit for fertilizing and a group of University soils scientists, branch experiment station staff members and county agents will give a roundup of "fertility situation" reports on different crops and soils. Another group of research workers will summarize recent experimental work in soils and fertilizers.

## Fertilizer Plant Nears Completion in California

FELTON, CAL.—The Fersolin Corp., formed about two years ago, is completing an 8,000 sq. ft. plant at Felton, near Santa Cruz, Cal., to manufacture soil conditioner and fertilizer in combination. A feature of the chemical is the use of wood by-products, such as sawdust and similar lignocellulose wastes, in converted form with nitrogen, phosphorus, and potash.

## Gloomicides

The wife wanted to do some shopping during the day, so at breakfast she asked her husband for \$10.

"Money, money, money!" he shouted. "Every day of the week you want more money. If you ask me, I think you need brains more than you need money."

"Perhaps so," his wife agreed, "but I asked you for what I thought you had the most of."

★

"There are so many rude interruptions, Mr. Chairman," complained the speaker, "that I can hardly hear myself speaking."

"Don't let it bother you," piped up a voice from the rear. "You're not missing anything."

In the storeroom at the British camp, the sergeant and lieutenant in charge were debating what to do with the latest addition to their staff.

"Blimy if 'e ain't as thin as a ramrod," the sergeant complained. "Wot can 'e do here?"

"Let him clean the rifles," the lieutenant suggested.

"Clean the rifles!" shrilled the sergeant. "And 'oo's a-goin' to pull 'im through?"

★

"What did mama's little boy learn in school today?" simpered a lady at her offspring.

"I learned two boys," responded Junior, "not to call me 'mama's little boy'."

★

The beautiful young lady went to the psychiatrist's office for her first visit. The doctor looked at her for a few seconds, then said: "Come over

here, please." He promptly put his arms around her and kissed her. As he finally released her, he commented briskly, "That takes care of my problem. Now what's yours?"

★

The weekend hacker carefully addressed the ball and swung—producing a hole in which you could have buried a truck. He picked up the huge divot, hefted it in his hand, then turned to his caddy:

"What do I do with this?" he asked. "Take it home," the boy sighed, "and practice on it."

★

"I just saw your family ghost upstairs," gasped a man who was visiting an old mansion.

"Did it give you a start?" asked his host.

Replied the guest, "I didn't need one."



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## USDA REPORT

(Continued from page 17)

out the other continental regions and Puerto Rico. The smallest use of materials as carriers of pesticides was in the South Atlantic region, in which the largest tonnage of mixed ferti-

lizers was used for this purpose.

The largest tonnage of materials containing pesticides was used in California (1,495 tons), followed by Iowa (1,299 tons), Oregon (1,198

Table 5. - Materials containing pesticides for direct application consumed, in regions, year ended June 30, 1956, by class and by product, in tons

Class and product	New England	Middle Atlantic	South Atlantic	East North Central	West North Central	East South Central	West South Central	Mountain	Pacific	Territories	Total
<b>CHEMICAL NITROGEN MATERIALS</b>											
Ammonium nitrate	0	0	0	0	0	1	0	12	0	0	13
Ammonium sulfate	0	0	0	0	0	0	0	1	75	1,085	1,161
Nitrogen solutions	0	0	0	0	100	0	0	0	0	0	100
Ferrous ammonium sulfate	0	0	0	0	0	0	0	377	0	0	377
<b>NATURAL ORGANIC MATERIALS<sup>1/</sup></b>	135	696	0	0	10	0	0	137	1,347	0	2,325
<b>PHOSPHATE MATERIALS</b>											
Ammonium phosphate: 11-48	0	0	0	312	68	0	2	0	0	0	382
Ammonium phosphate: 13-39	0	0	0	28	662	0	34	0	0	0	724
Ammonium phosphate: 16-20	0	0	0	35	1,040	0	29	602	0	0	2,506
Superphosphates	0	0	0	0	0	0	0	0	0	0	0
Grades 22% and under	0	0	8	5	19	33	0	0	1,362	0	1,427
Grades over 22%	0	0	0	0	329	0	0	377	0	0	696
Other <sup>2/</sup>	0	0	0	0	4	0	0	0	0	0	4
<b>POTASH MATERIALS</b>											
Potassium chloride	0	0	6	0	7	0	0	0	30	0	43
Potassium sulfate	0	0	0	0	0	30	0	0	0	0	30
<b>SECONDARY &amp; TRACE NUTRIENT MATERIALS</b>											
Gypsum	0	0	0	0	0	0	0	70	987	0	1,057
Sulfur	0	0	32	0	0	0	0	0	45	0	77
<b>Total</b>	135	696	46	380	1,039	64	65	1,556	3,846	1,085	10,912

<sup>1/</sup> Activated sewage sludge, tankages, and other materials. <sup>2/</sup> Diammonium phosphate and dicalcium phosphate.

Table 6. - Mixed fertilizer-pesticide products consumed, year ended June 30, 1956, by class of pesticide, by State and region, in tons

State and region <sup>1/</sup>	Consumption with				Total
	Aldrin	Chlordane	Heptachlor	Other <sup>2/</sup>	
Maine	357	2	0	9	368
New Hampshire	0	3	0	7	10
Vermont	0	0	0	5	5
Massachusetts	5	47	0	87	139
Rhode Island	0	25	0	12	37
Connecticut	0	97	0	52	149
<b>New England</b>	362	174	0	172	708
New York	19	13	0	84	116
New Jersey	0	18	0	91	109
Pennsylvania	78	85	0	343	506
Delaware	10	1	0	16	27
District of Columbia	0	1	0	0	1
Maryland	691	204	60	22	977
West Virginia	0	2	0	7	9
<b>Middle Atlantic</b>	798	324	60	563	1,745
Virginia	4,578	27	0	10	4,615
North Carolina	493	1,926	0	6	2,425
South Carolina	413	12,439	3	1,560	14,415
Georgia	665	2,338	124	90	3,217
Florida	4,066	3/ 17,382	788	85	22,321
<b>South Atlantic</b>	10,215	34,112	915	1,751	46,993
Ohio	2,178	0	0	275	2,453
Indiana	1,707	0	301	79	2,087
Illinois	6,504	0	545	221	7,270
Michigan	372	0	0	62	434
Wisconsin	2,720	7	99	91	2,917
<b>East North Central</b>	13,481	7	945	728	15,161
Minnesota	1,001	0	167	97	1,265
Iowa	19,472	0	2,388	21	21,881
Missouri	3,344	0	0	66	3,410
North Dakota	199	0	0	6	205
South Dakota	57	0	3	8	68
Nebraska	2,484	0	313	14	2,811
Kansas	780	6	1	9	796
<b>West North Central</b>	27,337	6	2,872	221	30,436
Kentucky	970	281	43	35	1,329
Tennessee	741	156	1,149	3	2,049
Alabama	1,778	375	0	258	2,411
<b>East South Central</b>	3,489	812	1,192	296	5,789
Arkansas	158	0	0	3	161
Louisiana	541	0	0	0	541
Oklahoma	737	0	0	7	744
Texas	0	0	0	3	3
<b>West South Central</b>	1,436	0	0	13	1,449
Montana	0	4	0	17	21
Idaho	266	23	0	267	556
Wyoming	0	0	0	8	8
Colorado	94	0	0	42	136
Utah	0	41	0	1	42
Nevada	0	0	0	8	8
<b>Mountain</b>	360	68	0	343	771
Washington	888	157	0	90	1,135
Oregon	187	37	0	125	349
California	1,305	162	0	205	1,672
<b>Pacific</b>	2,380	356	0	420	3,156
Continental U. S.	59,858	35,859	5,984	4,507	106,208
Puerto Rico	3,737	0	0	11	3,748
<b>Total</b>	63,595	35,859	5,984	4,518	109,956
<b>Percent</b>	57.84	32.61	5.44	4.11	100.00

<sup>1/</sup> No consumption in States or areas unlisted. <sup>2/</sup> Products compounded with dieldrin, BHC, 2,4-D, DDT, or toxaphene. <sup>3/</sup> Includes 135 tons containing chlordane and DDT.

tons), Washington (1,153 tons), and Puerto Rico (1,085 tons). The total of these accounted for 57.1% of the national consumption.

Pesticides were contained in 5,729 tons of phosphate materials or 52.5% of the total tonnage of materials used for this purpose. Ammonium phosphate (11-48, 13-39, 16-20) accounted for 3,612 tons. These were consumed mostly in the North Central regions which are customarily large users of these kinds of materials. Superphosphates, the principal carriers of pesticides in the Pacific region, accounted for practically all of the remaining tonnage of phosphate-pesticide products.

**The class of products used as the next largest carriers of pesticides were the natural organic materials (2,325 tons). These were used most extensively on the west coast.**

Ammonium sulfate accounted for 73.2% (1,161 tons) of the consumption of chemical nitrogen materials containing pesticides and the use was nearly all in Puerto Rico.

Insignificant quantities of potash salts carried pesticides. Some potassium sulfate was used for this purpose in the East South Central region and the use of potassium chloride was scattered through three regions.

Gypsum and sulfur were the only secondary and trace nutrient materials containing pesticides.

## Pesticide

It was estimated from the information supplied by the manufactur-

ers that the quantity of pesticides incorporated in fertilizers in the continental U.S. in 1955-56 amounted to 552 tons—467 tons of aldrin, chlordane, dieldrin, heptachlor, and toxaphene; 31 tons of IPC; 24 tons of 2,4-D; 29 tons of DDT, and 1 ton of arsenical compounds. Excepting IPC, these quantities represented 1.52%, .15%, .08% and .01% of the respective total disappearances of these pesticides (10) in this period. Information on the total disappearance of IPC was not available. The tonnages of some of these products are not reported separately to avoid revealing the business of individual establishments.

More than 57% (63,595 tons) of the mixed fertilizer products (table 6) and 58% (6,393 tons) of the material products (Table 7) contained aldrin. Most concentrations came within the range of 8 to 12 lb. per ton of fertilizer.

Chlordane was used in 32% (35,859) tons of the mixed fertilizer products and 13% (1,396 tons) of the material products. Most products contained 2 to 10 lb. per ton of fertilizer. Products containing chlordane were marketed in greater volume than those containing aldrin in most of the New England, Middle Atlantic, and South Atlantic states.

Heptachlor was incorporated in 5% (5,984 tons) of mixed fertilizer products and 4% (436 tons) of the material products at concentrations of 4 to 10 lb. per ton. Fertilizers containing this pesticide were consumed principally in Iowa, Tennessee, Florida, and Illinois.

The use of IPC and inorganic pesticides was an additive to materials only. IPC added to gypsum and sulfur

Table 7. - Materials containing pesticides consumed, year ended June 30, 1956, by class of pesticide, by State and region, in tons

State and region <sup>1/</sup>	Consumption with				Total
	Aldrin	Chlordane	Heptachlor	IPC	
Massachusetts	0	11	0	0	11
Rhode Island	0	42	0	0	42
Connecticut	0	82	0	0	82
<b>New England</b>	0	135	0	0	135
New York	0	477	0	0	477
New Jersey	0	175	0	0	175
Pennsylvania	0	44	0	0	44
<b>Middle Atlantic</b>	0	696	0	0	696
Virginia	0	0	0	0	2/ 32
South Carolina	6	3	0	0	9
Georgia	0	1	0	0	1
Florida	0	4	0	0	4
<b>South Atlantic</b>	6	8	0	0	46
Ohio	10	0	0	0	10
Indiana	128	0	0	0	128
Illinois	242	0	0	0	242
<b>East North Central</b>	380	0	0	0	380
Minnesota	9	0	0	0	9
Iowa	1,291	0	8	0	1,299
Missouri	38	0	0	0	38
North Dakota	312	0	0	0	312
South Dakota	54	0	4	0	58
Nebraska	912	0	20	0	932
Kansas	380	3/ 10	0	0	4/ 391
<b>West North Central</b>	2,996	10	32	0	3,039
Kentucky	29	0	0	0	29
Tennessee	3	32	0	0	35
<b>East South Central</b>	32	32	0	0	64
Oklahoma	65	0	0	0	65
<b>West South Central</b>	65	0	0	0	65
Idaho	462	0	0	70	2/ 976
Colorado	65	0	0	0	65
New Mexico	0	138	0	0	138
Utah	0	3/ 376	0	0	376
Nevada	0	3/ 1	0	0	1
<b>Mountain</b>	527	515	0	70	1,556
Washington	235	0	0	918	1,153
Oregon	749	0	404	45	1,198
California	328	0	0	0	6/ 1,495
<b>Pacific</b>	1,312	0	404	963	3,846
Continental U. S.	5,318	1,396	436	1,033	9,827
Puerto Rico	1,075	0	0	0	7/ 1,085
<b>Total</b>	6,393	1,396	436	1,033	10,912
<b>Percent</b>	58.59	12.79	4.00	9.47	100.00

<sup>1/</sup> No consumption in States or areas unlisted. <sup>2/</sup> Contains DDT. <sup>3/</sup> Includes products containing both chlordane and arsenical compounds. <sup>4/</sup> Includes one ton with dieldrin. <sup>5/</sup> Includes 444 tons with DDT. <sup>6/</sup> Includes 1,167 tons with lead arsenate. <sup>7/</sup> Includes 10 tons with BHC.



was consumed only in the western states, particularly Washington. Lead arsenate added together with chlordane to ferrous ammonium sulfate was used exclusively in Utah and Nevada, while arsenical compounds were added to low nitrogen organic materials in California.

Other products totaling 5,005 tons were compounded with BHC, 2,4-D, DDT, dieldrin, or toxaphene in varying concentrations.

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### Weed Control Considered as Method to Stop Hay Fever

PITTSBURGH—County health department officials are considering weed control during next year's hay fever season.

According to the department's quarterly report, the stage was set for such a weed eradication program by a pollen-count survey this year.

Counts taken at five locations in the county showed the Labor Day week end was the worst for hay fever sufferers. Frequent summer rains held the count low until mid-August.

The quarterly report says full-scale weed control programs would require an effort of from three to five years to obtain permanent results. But a one-year program would indicate the feasibility of a permanent program.

### FARMERS WARNED

WINNIPEG—Farmers in Western Canada are being urged to check their farm-stored grain for insects, especially grain beetles and mites. The rust grain beetle is one of Western Canada's most serious insect pests of stored grain, especially wheat. It causes damage to grain by feeding on it, and by causing it to heat and spoil.

## Despite Record Alabama Corn Yield Farmers Only Break Even, Report Says

AUBURN, ALA.—Alabama's 1958 average corn yield—a record 32 bu. acre—is still too low for farmers to do much more than break even on the crop. It takes yields of about 50 bu. and up to make any real money in this day and time.

The reason, extension experts argue, is the higher cost of production. Back in 1946, when the more-corn-per-acre campaign started, the state yield was half what it is today—and farming costs were less than half. Naturally, the 30-bushel goal set at that time seemed an ambitious one, both from the standpoint of yield and profit.

That yield goal has been passed. But, as was pointed out here by O. N. Andrews of the Alabama Polytechnic Institute Extension Service, "Profits are hard to find in 30-bu. corn."

According to the agronomist, growers that average 30 bu. per acre spend \$1.20 bu. to produce the corn. Sixty-bushel corn, on the other hand, costs an average of only 60¢ a bu. to grow.

Except in the 17 corn-allotment counties, which have a support price of \$1.49, Mr. Andrews said the government support price on corn is now \$1.12 bu.

Growers who feed their corn to livestock rather than sell it for cash are making about twice as much from each bushel.

"Although our state average was 32 bu., the fact is that most people who are really in the business of farming for a living made 50 to 100 bu., or even more," said Mr. Andrews. "In my opinion, those satisfied with 30 bu. won't be growing the crop for long. Competition will see to that."

"Wonderful growing weather was a big factor in high yields this year. A bad year might cut us back. Nevertheless, you can count on good farmers trying in every way every year to turn out bumper crops."

J. C. Lowery, also an extension agronomist—and the man who helped get the more-corn drive under way—said that when the campaign began, good corn growers were using around 150 lb. of complete fertilizer and 15 to 20 lb. of nitrogen per acre. Now these farmers use upward of 250 lb.

of complete fertilizer and 60 to 120 lb. of nitrogen.

Back then, there were no hybrids; today about 85% of the acreage is in adapted hybrids, according to Mr. Lowery. Then farmers allowed 10 sq. ft. per stalk; now they have one third that much—or, in other words, they now grow three times as many stalks per acre.

Mr. Andrews said Alabama's current corn crop is being harvested from 2,000,000 acres, so that total will be 67,000,000 bu.

He estimated that "far more than 500 growers have made 100 bu. per acre on one or more acres." Thousands of farmers have averaged 50 bu. or more on their entire corn crops. In demonstrations all over the state, 4-H Club members have made from 75 to 120 bu. per acre.

### Texas Chemist Urges Increased Nitrogen Use

COLLEGE STATION, TEXAS—The application of nitrogen fertilizer at seeding time in the fall increases the grazing value of small grains and step up their forage production during the fall and winter months, said W. F. Bennett, extension soil chemist. The quality of their forage will be improved, too, he added.

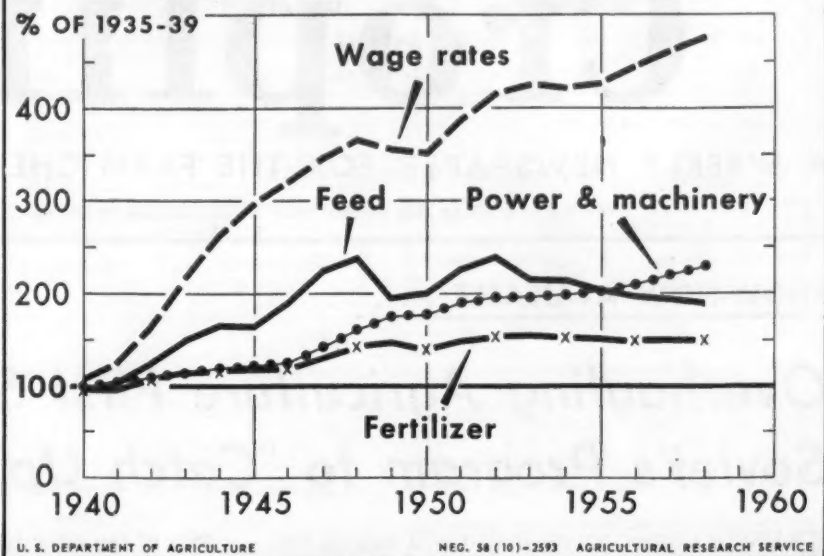
Nitrogen needs will vary, pointed out the chemist. Some soils require no additional nitrogen while others need from 20 to 40 lb. an acre.

Phosphorus is another plant food that is often needed by fall sown small grain. The amount may vary from none to 40 lb. an acre. On sandy, light textured soils, potash may also be needed, said Mr. Bennett.

If fall seeded small grains are to be used for grain production and not grazed, Mr. Bennett felt nitrogen should have been applied at seeding time in the areas north of Waco, because of the possibility of winter killing. An early spring application of nitrogen is recommended for these areas.

In order to determine the exact fertilizer needs for a particular field, Mr. Bennett recommended soil testing. Complete details on how to take soil samples and prepare them for mailing to a soil testing laboratory may be obtained from local county agents, he said.

## CHANGES IN FARM COST RATES



**BIG BARGAIN**—Compared with other farm costs, which have risen by leaps and bounds over the years, the prices of fertilizer have remained relatively low. According to a report issued by the U.S. Department of Agriculture, fertilizer prices are expected to remain at present levels. In the graph above, the rising costs of farm operation are analyzed and the results show that fertilizer seems to be still a good bargain. In the year ending Sept. 15, in fact, fertilizer costs were down 1% from the preceding year.

### 50% Increase in Forage Yields Seen

LEXINGTON, KY.—The report that forage yields can be increased 50% and the quality of the herbage greatly increased, by fertilizing pastures, was made by Dr. G. T. Webster, head of the University of Kentucky's agronomy department. He said that in Kentucky alone, more than 8,600,000 acres of pasture land could be profitably fertilized.

At the present time, farmers are using only 25 lb. of fertilizer per acre on their pastures, compared to 250 lb. recommended by agronomists of the University.

Where legumes are part of the pasture seeding mixture, some nitrogen is needed in addition to the phosphate and potash in fertilizer applied, Dr. Webster says. Lime may be needed, also, if the soil tests indicate.

The job of keeping legumes in the pasture stand, once they are established, calls for regular applications of fertilizer containing phosphate and potash, he points out.

H. F. Miller, extension agronomist

of the University, reports that if recommended amounts of fertilizer were used on Kentucky's present hay and pasture land, there would be a market for close to 1,000,000 tons of fertilizer.

Mr. Miller points out that agriculture is dependent on fertilizer for profitable production. "Without lime and fertilizer," he says, "crop yields would be low and in some cases would hardly meet the cost of production."

### Texas Meeting Set

LUBBOCK, TEXAS—"Profitable Use of Agricultural Chemicals" is the theme for the sixth annual Agricultural Chemicals Conference to be held on the campus of Texas Technological College here, Feb. 10-12.

Research and industry speakers will discuss financing, economics and dealers' problems. Current production problems will undergo scrutiny by a corps of scientists.

Dr. A. W. Young, head of the agronomy department, Texas Tech, is program chairman.

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# Croplife

A WEEKLY NEWSPAPER FOR THE FARM CHEMICAL INDUSTRY

The regional circulation of this issue is concentrated in the Southern states.

## KNOW-HOW AVAILABLE . . .

### Overhauling Agriculture First Step in Soviet's Program to "Catch Up" with U.S.

**R**USSIA's latest boast—that it will surpass the living standards of the West by 1970—has made many thoughtful people in the U.S. and other advanced nations wonder how much of a role its agricultural program will play in this loudly-heralded renaissance. There are relatively few people in the U.S. who have had opportunities to observe the Russian scene from the viewpoint of an agricultural expert, so the remarks of such a person bear more weight than might be given to ordinary travelers in the USSR.

One such observer is Dr. Marlin G. Cline of the New York State College of Agriculture at Cornell University. He is a soil scientist, and is one of a very few Americans who have been allowed to see, first hand, how the Russians are pulling out the stops to achieve their vaunted advances scheduled to take place in the next dozen years or so.

Last summer he went on a whirlwind tour of Soviet agriculture. With six other American scientists, sponsored by the U.S. Department of Agriculture, he wanted to see how the Russians manage their soil and water. The group covered 10,000 miles in 30 days.

Dr. Cline says the Soviets are making no bones about their intentions. There are signs and posters displayed at most of the collective and state farms urging the people to produce, produce, and produce some more, he reports. The primary objective is, of course, to equal the United States in per capita production of meat, butter, and milk.

"And there's nothing to prevent them from doing it, except possibly their economic system," Dr. Cline says. "They certainly have the physical resources."

Most of Russia's agricultural land is like the Dakotas, he says. "They grow alfalfa well, but their corn doesn't match ours." But the Russians are determined to grow everything—so determined in fact that they're doing things that would appal the American farmers.

"They're growing apples, for example, in climate similar to that of Saskatchewan, Canada. To do it, they prune heavily to keep the trees from growing more than two feet tall, and then bend the branches out so winter snow will act as a protective mulch. The result: An apple bush about 12 by 20 feet with questionable yields."

Besides fruit, most all the farms grow wheat, corn, and some industrial crop such as sunflower, cotton, and sugar beets; and raise cattle, sheep, hogs, and poultry.

Soviet scientists are tailoring even their research to diversification. They've developed varieties that make it possible to grow rice in cold sectors.

Dr. Cline thinks this diversification may be due partly to poor roads, which make it hard to ship farm commodities long distances, or the administrative process of allocating production goals down from Moscow to the Republics, to the Regions, and subsequently to the farms. Presumably, this set-up makes it easier for the commissars to keep tab on progress being made under the current seven-year plan.

Diversification is facilitated by the Soviet collective farm—a Communist trademark. A typical collective farm, Dr. Cline says, has 10,000 to 45,000 acres, 200 to 700 families, and 300 to 1,000 workers. About

50% of the labor force is women. There are also state farms which are generally larger than the collectives and have more workers.

Despite their continual pressure against anything smacking of capitalistic philosophy, some of the Soviets still display faint leanings in that direction. Dr. Cline says he noted that the little private plots, which the farm workers are allowed to use for their own production, are usually better kept and more productive than the state-controlled areas.

Fertility practices and pest control information are well known in Russia, because it possesses an elaborate translation service which publishes abstracts of scientific articles from all countries of the world. "Sometimes they will translate and publish entire articles, and even whole textbooks," Dr. Cline reports. And typical of their attitude toward the rest of the world in general, the Russians completely ignore copyrights and publish whatever they want without regard to ownership.

Significantly, the Russians seem to have full access to all kinds of bulletins and reports from various U.S. sources and are attempting to make use of this knowledge under their own conditions.

**Will the Communists "catch up" with the Western nations in a few years? Not many will hazard a prediction on this score, but it is evident that leaders in Moscow recognize the futility of trying to carry on a progressive program in the country without first putting agriculture on a more productive basis.**

Troublesome as our surpluses are to our own economy, they must be viewed with considerable envy by the Kremlin. Apparently the seven-year plan aims to emulate much of our production techniques, but there will no doubt be monumental problems of distribution.

Good fertilization, seed protectants, weed, insect, and plant disease control will be important factors in the Soviet's bold forward movement. Possibly the building of adequate manufacturing facilities for these products will remain a serious bottleneck in achieving their vaunted agricultural millennium.

### Duster Accidents Analyzed

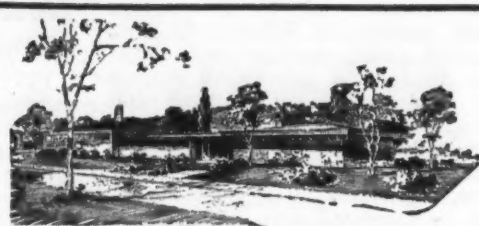
**W**HAT causes the majority of accidents in aerial crop spraying and dusting operations? Of 370 accidents reported by the Civil Aeronautics Board for 1957, 43 were fatal mishaps. The accident rate of 4.27 for each 10,000 hours of flying was reported to be highest since 1953, but the fatal accident rate, 0.5 for each 10,000 hours was the lowest in the 1951-57 period.

According to the report, these averages were based on statistics showing 5,100 aircraft and 4,100 pilots engaging in a total of 865,800 hours in aerial application activities in the U.S. last year.

Here are some of the causes of accidents as outlined by CAB. Collisions with objects accounted for the largest number, the board said. These totaled 166. Next in frequency, it said, were stall accidents.

Critics of pesticide use sometimes try to place on the toxicants all the blame for accidents, saying that pilots become groggy from the effects of the material, thus losing control of their planes.

CAB's report, however, stated that in only nine cases were chemicals a contributing factor. It is likely that, in most of these cases, safety measures were not used to the fullest extent.



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# MEETING MEMOS

Dec. 4-5—Arkansas Plant Food Educational Society, annual meeting and fertilizer conference, University of Arkansas, Fayetteville, Ark.

Meeting Memos listed above are being listed in this department this week for the first time.

Dec. 2-3—Far West Regional Accident Prevention School, Fresno, Cal.

Dec. 3-4—North Central Weed Control Conference, Netherland Hilton Hotel, Cincinnati.

Dec. 3-4—Annual Soil Fertility and Plant Nutrition Short Course, University of Missouri, College of Agriculture, Columbia, Mo.

Dec. 3-4—Alabama Soil Fertility Society, Annual Meeting, Whitley Hotel, Montgomery, Ala., Charles W. Summerour, P.O. Box 120, Montgomery, Ala., Secretary-Treasurer.

Dec. 3-5—Agricultural Ammonia Institute, Annual Meeting, Morrison Hotel, Chicago, Jack F. Criswell, Claridge Hotel, Memphis, Executive Vice President.

Dec. 4-5—Southeastern Conference on Mineral Nutrition of Forest Trees, Duke University, Durham, N.C.

Dec. 8—Annual Soils and Fertilizer Short Course, Coffey Hall, University of Minnesota Institute of Agriculture, St. Paul.

Dec. 8-10—Chemical Specialties Manufacturers Assn., Annual Meeting, Commodore Hotel, New York.

Dec. 17-18—Beltwide Cotton Production Conference, Rice Hotel, Houston, Texas, sponsored by the National Cotton Council.

1959

Jan. 7-8—Fertilizer Short Course, Iowa State College, Ames.

Jan. 7-8—Fifth Annual Insect Control Conference, Mississippi State University, State College, Miss.

Jan. 7-9—Thirteenth Annual Northeastern Weed Control Conference, Hotel New Yorker, New York.

Jan. 12-13—Ohio Pesticide Institute, annual winter meeting, Nell House, Columbus, Ohio. J. D. Wilson, Secretary, Agricultural Experiment Station, Wooster, Ohio.

Jan. 20-22—California Weed Conference, Miramar Hotel, Santa Barbara, Cal.

Jan. 21-22—Northwest Agricultural Chemicals Industry Conference, Benson Hotel, Portland, Ore.; George Kitzmiller, Pacific Cooperatives, Portland, conference chairman.

Jan. 21-23—Western Cooperative

Spray Project, Benson and Imperial Hotels, Portland, Ore.

Jan. 22-24—Agricultural Aircraft Assn., Senator Hotel, Sacramento, Cal.; Wanda Branstetter, Chandler Field, Fresno, Cal., Executive Secretary.

Jan. 27-28—Nematology Workshop, Portland, Ore., sponsored by Shell Chemical Corp.

Jan. 27-28—Soil Science Society of North Carolina, Williams Hall, North Carolina State College, Raleigh.

Jan. 28-29—Illinois Custom Spray Operators' Training School, 11th annual meeting, University of Illinois, Urbana.

Jan. 29—South Dakota Fertilizer Dealer Short Course, South Dakota State College, Brookings, S.D.

Jan. 29-30—Colorado Agricultural Chemicals Assn., Cosmopolitan Hotel, Denver. D. E. Garrison, Box 623, Greeley, Colo., secretary.

Feb. 10-12—Agricultural Chemicals Conference, sixth annual meeting, Texas Technological College, Lubbock, Texas.

Feb. 12-13—Midwestern Agronomists-Fertilizer Industry Representatives, 11th annual meeting, Edgewater Beach Hotel, Chicago, Ill., sponsored by National Plant Food Institute.

Feb. 24-25—Alabama Pest Control Conference, Alabama Polytechnic Institute, W. G. Eden, Secretary-Treasurer, Alabama Association for Control of Economic Pests, Alabama Polytechnic Institute, Auburn, Ala.

June 9-10—Seventeenth Annual Convention of the Association of Southern Feed and Fertilizer Control Officials, Velda Rose Motel, Hot Springs, Ark.; Bruce Poundstone, University of Kentucky, Lexington, Ky., secretary-treasurer.

July 7-9—Pacific Northwest Plant Food Assn., 10th Annual Regional Fertilizer Conference, Tacoma, Wash.

## Salesmen's Christmas Party

NEW YORK — The Salesmen's Association of the American Chemical Industry, Inc., will hold its annual Christmas party "Winter Carnival" on Wednesday evening, Dec. 17, at the Waldorf-Astoria Hotel, New York, according to Paul E. McCoy of American Potash & Chemical Corp., chairman of the SAACI entertainment committee. A cocktail party will be held from 5:45 p.m. to 7:15 p.m., dinner is to start at 7:15 p.m. and the entertainment program is scheduled to start at 8:45 p.m.

More door prizes than ever before have been arranged, according to Mr. McCoy.

# Classified Ads

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## MACHINERY FOR SALE

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## MISCELLANEOUS

**KILL BRUSH** at low cost with amazing R-H Brush Rhap. Will not injure grasses, grains, cattle, or other animals. See your dealer, or write Reesor-Hill Corporation, Box 34CL, Jacksonville, Ark.

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## Break in Texas Drouth Increases Citrus Yield

WESLACO, TEXAS — The heavy rainfall that broke the long drouth in South Texas helped increase citrus yields from 5,598,469 boxes in the 1956-57 season to 7,101,643 boxes for 1957-58.

Grapefruit boxes increased from 2,800,000 to 4,000,000 during the same period, while oranges rose from 1,600,000 to 2,200,000 boxes, according to the Valley Chamber of Commerce.

Most of the fruit is irrigated, and prior to this season the Rio Grande River's flow was below normal. Now going into a new season, the Falcon

Dam has filled, which should insure producers enough water for the coming year.

Fall vegetables for Texas have been estimated at 12% above last year, however the tomato yield has been lowered in South Texas because of adverse weather.

## NEW FIRM

SAN JOSE, CAL.—A new half million dollar chemical firm has been organized here to process sewage sludge into organic fertilizer. The company is known as the Plant Gro Corp. Officers of the firm include Irving J. Levy and Alvin D. Ravel, both of San Jose.

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Baughman Manufacturing Co., Inc. ....	Monsanto Chemical Co. ....
Bemis Bro. Bag Co. ....	National Distillers & Chemical Corp. ....
Blue, John, Co. ....	National Potash Co. ....
Bradley & Baker ....	Naugatuck Chemical Div., U. S. Rubber Co. ....
Broyhill Company, The ....	Niagara Chemical Division ....
Burgess Publishing Co. ....	Northern Peat Moss ....
Chantland Mfg. Co. ....	Northwest Nitro-Chemicals, Ltd. ....
Chase Bag Co. ....	Olin Mathieson Chemical Corp. ....
Chemagro Corp. ....	Pacific Coast Borax Co. ....
Chemical Eng. Serv. Div. of ....	Penick, S. B., & Co. ....
Manitowoc Shipbuilding, Inc. ....	Pennsalt of Washington Div. of ....
Chemical Insecticide Corp. ....	Pennsalt Chemical Corp. ....
Clover Chemical Co. ....	Phillips Chemical Co., a subsidiary of ....
College Science Publishers ....	Phillips Petroleum Co. ....
Collier Carbon & Chemical Corp. ....	Potash Company of America ....
Commercial Solvents Corp. ....	Raymond Bag Co. ....
Consolidated Mining & Smelting Co. ....	Roberts Chemicals, Inc. ....
Crown Zellerbach Corp. ....	Sackett, A. J., & Sons ....
Dallas Tank Mfg. Co. ....	Shattuck, S. W., Chemical Co. ....
Davison Chemical Co. ....	Shell Chemical Corp. ....
Deere, John, & Co. ....	Simonsen Mfg. Co. ....
Dempster Mill & Mfg. Co. ....	Sinclair Chemicals, Inc. ....
Diamond Alkali Co. ....	Smith-Douglass Co., Inc. ....
Dow Chemical Co. ....	Smith-Rowland Co., Inc. ....
E. I. du Pont de Nemours & Co., Inc. ....	Sohio Chemical Co. ....
Duval Sulphur & Potash Co. ....	Southern Nitrogen Co. ....
Eastern States Petroleum & Chem. Corp. ....	Southwest Potash Corp. ....
Emulsol Chemical Corp. ....	Spencer Chemical Co. ....
Escambia Chemical Corporation ....	Spraying Systems Co. ....
Flexo Products, Inc. ....	Standard Oil Co. ....
Food Machinery & Chemical Corp. ....	Stapan Chemical Co. ....
Frontier Chemical Co. ....	Stewart-Warner Corp. ....
Gates Rubber Co. ....	Successful Farming ....
Geigy Agric. Chemicals ....	Tennessee Corp. ....
Grace Chemical Co. ....	Texas Gulf Sulphur Co. ....
Grand River Chemical Div. of Deere & Co. ....	Union Bag-Camp Paper Corp. ....
Hanson Equipment Co. ....	U. S. Borax & Chem. Corp. ....
Harshaw Chemical Co. ....	U. S. Industrial Chemicals Co. ....
Henderson Mfg. Co. ....	U. S. Phosphoric Products Division ....
Hercules Powder Co. ....	U. S. Potash Co. ....
Highway Equipment Co. ....	U. S. Rubber Co., Naugatuck Chem. Div. ....
Hough, Frank G., Co. ....	U. S. Steel Corp. ....
Inland Chemical Corp. ....	Velsicol Chemical Corp. ....
International Minerals & Chemical Corp. ....	Wisconsin Eqpt. & Distr. Co. ....
Johns-Manville Corp. ....	
Jones, Robin, Phosphate Co. ....	
Kalo Inoculant Co. ....	
Kent, Percy, Bag Co. ....	
Kraft Bag Corp. ....	

## CALENDAR FOR 1958-59

DECEMBER	JANUARY	FEBRUARY	MARCH
S M T W T F S	S M T W T F S	S M T W T F S	S M T W T F S
1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
7 8 9 10 11 12 13	8 9 10 11 12 13 14	8 9 10 11 12 13 14	8 9 10 11 12 13 14
14 15 16 17 18 19 20	15 16 17 18 19 20 21	15 16 17 18 19 20 21	15 16 17 18 19 20 21
21 22 23 24 25 26 27	18 19 20 21 22 23 24	22 23 24 25 26 27 28	22 23 24 25 26 27 28
28 29 30 31	25 26 27 28 29 30 31		29 30 31
APRIL	MAY	JUNE	JULY
S M T W T F S	S M T W T F S	S M T W T F S	S M T W T F S
1 2 3 4	1 2	1 2 3 4 5 6	1 2 3 4
5 6 7 8 9 10 11	3 4 5 6 7 8 9	7 8 9 10 11 12 13	5 6 7 8 9 10 11
12 13 14 15 16 17 18	10 11 12 13 14 15 16	14 15 16 17 18 19 20	12 13 14 15 16 17 18
19 20 21 22 23 24 25	17 18 19 20 21 22 23	21 22 23 24 25 26 27	19 20 21 22 23 24 25
26 27 28 29 30	24 25 26 27 28 29 30	28 29 30	26 27 28 29 30 31
AUGUST	SEPTEMBER	OCTOBER	NOVEMBER
S M T W T F S	S M T W T F S	S M T W T F S	S M T W T F S
1	1 2 3 4 5	1 2 3	1 2 3 4 5 6 7
2 3 4 5 6 7 8	6 7 8 9 10 11 12	4 5 6 7 8 9 10	8 9 10 11 12 13 14
9 10 11 12 13 14 15	13 14 15 16 17 18 19	11 12 13 14 15 16 17	15 16 17 18 19 20 21
16 17 18 19 20 21 22	20 21 22 23 24 25 26	18 19 20 21 22 23 24	22 23 24 25 26 27 28
23 24 25 26 27 28 29	27 28 29 30	25 26 27 28 29 30 31	29 30
30 31			



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